EMCON
1921 Ringwood Avenue • San Jose, California 95131-1721 • (408) 453-7300 • Fax (408) 437-9526

98 APR -2 PM

Date March 31, 1998
Project 20805-135.007

To:

Ms. Susan Hugo
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

We are enclosing:

Copies	Description
1	Fourth quarter 1997 groundwater monitoring results and remediation system performance evaluation report for ARCO service station 6148, Oakland, California

For your:	X	Use	Sent by:	X	Regular Mail
		Approval			Standard Air
		Review			Courier
		Information			Other:

Comments:
The enclosed groundwater monitoring report is being sent to you per the request of ARCO Products Company. Please call if you have questions or comments.

Gary P. Messerotes
Project Manager

cc: Paul Supple, ARCO Products Company
File

ARCO Products Company

Date: March 31, 1998

Re: ARCO Station # 6148 • 5131 Shattuck Avenue • Oakland, CA
Fourth Quarter 1997 Groundwater Monitoring Results and
Remediation System Performance Evaluation Report

"I declare, that to the best of my knowledge at the present time, that the information and/or recommendations contained in the attached proposal or report are true and correct."

Submitted by:

Paul Supple
Environmental Engineer

EMCON
1921 Ringwood Avenue • San Jose, California 95131-1721 • (408) 453-7300 • Fax (408) 437-9526

March 13, 1998
Project 20805-135.007

Mr. Paul Supple
ARCO Products Company
P.O. Box 6549
Moraga, California 94570

Re: Fourth quarter 1997 groundwater monitoring results and remediation system performance evaluation report, ARCO service station 6148, Oakland, California

Dear Mr. Supple:

This letter presents the results of the fourth quarter 1997 groundwater monitoring program at ARCO Products Company (ARCO) service station 6148, 5131 Shattuck Avenue, Oakland, California (Figure 1). Operation and performance data for the on-site soil-vapor extraction (SVE), air-sparge (AS), and air-bubbling remediation systems are also presented. The quarterly monitoring program complies with Alameda County Health Care Services Agency (ACHCSA) requirements regarding underground tank investigations.

LIMITATIONS

No monitoring event is thorough enough to describe all geologic and hydrogeologic conditions of interest at a given site. If conditions have not been identified during the monitoring event, results should not be construed as a guarantee of the absence of such conditions at the site, but rather as the product of the scope, and limitations, of work performed during the monitoring event.

Please call if you have questions.

Sincerely,

EMCON

Valli Voruganti, P.E.
Project Engineer

Gary P. Messerotes, R.G. 5650
Project Manager

REGISTERED GEOLOGIST
GARY P. MESSEROTES
5650
STATE OF CALIFORNIA

March 13, 1998

ARCO QUARTERLY REPORT

Station No.: 6148	Address: 5131 Shattuck Avenue, Oakland, California
EMCON Project No.	20805-135.007
ARCO Environmental Engineer/Phone No.:	Paul Supple /(510) 299-8891
EMCON Project Manager/Phone No.:	Gary P. Messerotes /(408) 453-7300
Primary Agency/Regulatory ID No.:	ACHCSA /Susan Hugo
Reporting Period:	October 1, 1997 to January 1, 1998

WORK PERFORMED THIS QUARTER (Fourth- 1997):

1. Prepared and submitted quarterly report for third quarter 1997.
2. Conducted quarterly groundwater monitoring and sampling for fourth quarter 1997.
3. Operated air-bubbling system.

WORK PROPOSED FOR NEXT QUARTER (First- 1998):

1. Prepare and submit quarterly report for fourth quarter 1997.
2. Perform quarterly groundwater monitoring and sampling for first quarter 1998.
3. Continue operation of air-bubbling system.
4. Restart soil-vapor extraction (SVE) if hydrocarbon concentrations in extracted soil vapor warrant.

QUARTERLY MONITORING:

Current Phase of Project:	Quarterly Groundwater Monitoring and Operation and Maintenance of Remediation Systems The SVE system was shut down on October 3, 1996, because of maintenance problems. The SVE system remained shut down because of low TVHg concentrations in the extracted soil vapor.
Frequency of Sampling:	Quarterly (groundwater), Monthly (SVE)
Frequency of Monitoring:	Quarterly (groundwater), Monthly (SVE, air-sparge, and air-bubbling)
Is Floating Product (FP) Present On-site:	☐ Yes ☒ No
Bulk Soil Removed to Date :	560 cubic yards of TPH-impacted soil
Bulk Soil Removed This Quarter :	None
Water Wells or Surface Waters, within 2000 ft., impacted by site:	None
Current Remediation Techniques:	SVE, Air-Sparge, and Air-Bubbling Systems
Average Depth to Groundwater:	16.78 feet
Groundwater Gradient (Average):	0.014 ft/ft toward south-southwest (consistent with past events)

SVE QUARTERLY OPERATION AND PERFORMANCE:

Equipment Inventory:	Therm Tech Model CATVAC-10E, Electric/Catalytic Oxidizer
Operating Mode:	Catalytic Oxidation
BAAQMD Permit #:	25126
TPH Conc. End of Period (lab):	NA (Not Available)
Benzene Conc. End of Period (lab):	NA
Flowrate End of Period:	NA

HC Destroyed This Period:	0.0 pounds
HC Destroyed to Date:	1885.6 pounds
Utility Usage Electric (KWH):	1178 KWH
Operating Hours This Period:	0.0 hours
Percent Operational:	0.0%
Operating Hours to Date:	2697.5 hours
Unit Maintenance:	Routine monthly maintenance
Number of Auto Shut Downs:	0
Destruction Efficiency Permit Requirement:	90% if POC concentrations are below 1,000 ppmv
Percent TPH Conversion:	NA
Average Stack Temperature:	NA
Average Source Flow:	0.0 scfm
Average Process Flow:	0.0 scfm
Average Source Vacuum:	0 inches of water

ATTACHED:

- Table 1 - Groundwater Monitoring Data, Fourth Quarter 1997
- Table 2 - Historical Groundwater Elevation and Analytical Data, Petroleum Hydrocarbons and Their Constituents
- Table 3 - Historical Groundwater Analytical Data, Volatile and Semivolatile Organic Compounds
- Table 4 - Historical Groundwater Analytical Data, Metals
- Table 5 - Soil-Vapor Extraction System Operation and Performance Data
- Table 6 - Soil-Vapor Extraction Well Data
- Table 7 - Air-Sparge and Air-Bubbling Systems Operation and Performance Data
- Figure 1 - Site Location
- Figure 2 - Site Plan
- Figure 3 - Groundwater Data, Fourth Quarter 1997
- Figure 4 - Soil-Vapor Extraction and Treatment System, Historical System Influent TVHG and Benzene Concentrations
- Figure 5 - Soil-Vapor Extraction and Treatment System, Historical Hydrocarbon Removal Rates
- Appendix A - Analytical Results and Chain of Custody Documentation, Fourth Quarter 1997 Groundwater Monitoring Event
- Appendix B - SVE System Monitoring Data Log Sheets
- Appendix C - Analytical Results and Chain-of-Custody Documentation for Soil Vapor Extraction System, Fourth Quarter 1997

cc: Susan Hugo, ACHCSA

Table 1
Groundwater Monitoring Data
Fourth Quarter 1997

ARCO Service Station 6148
5131 Shattuck Avenue, Oakland, California

Date: 3-17-98

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	Oil & Grease SM 5520C	TRPH EPA 418.1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L
MW-1	11-10-97	107.80	18.10	89.70	ND	SSW	0.014	11-10-97	<50	<0 5	<0.5	<0 5	<0 5	4	--	--	--	--
MW-2	11-10-97	107.28	17.84	89.44	ND	SSW	0.014	11-10-97	<100^	<1^	<1^	<1^	1	74	--	--	--	--
MW-3	11-10-97	107.61	18 00	89.61	ND	SSW	0.014	11-10-97	350	8	<2^	3	3	230	--	--	--	--
MW-4	11-10-97	106.71	16 43	90.28	ND	SSW	0 014	11-10-97	Not sampled: well sampled semi-annually, during the first and third quarter									
MW-5	11-10-97	106.60	16 78	89.82	ND	SSW	0 014	11-10-97	<50	<0.5	<0 5	<0 5	<0.5	24	--	--	--	--
MW-6	11-10-97	105.13	14.52	90 61	ND	SSW	0.014	11-10-97	Not sampled: well sampled annually, during the first quarter									
MW-7	11-10-97	107.05	15.37	91 68	ND	SSW	0.014	11-10-97	Not sampled: well sampled annually, during the first quarter									

ft-MSL elevation in feet, relative to mean sea level
MWN: ground-water flow direction and gradient apply to the entire monitoring well network
ft/ft. foot per foot
TPHG: total petroleum hydrocarbons as gasoline, California DHS LUFT Method
µg/L: micrograms per liter
EPA. United States Environmental Protection Agency
MTBE: Methyl tert-butyl ether
SM: standard method
mg/L milligrams per liter
TRPH: total recoverable petroleum hydrocarbons
TPHD: total petroleum hydrocarbons as diesel, California DHS LUFT Method
ND: none detected
SSW south-southwest
^ The MRL was elevated due to high analyte concentration requiring sample dilution.
- - - not analyzed or not applicable

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995 - Present**

ARCO Service Station 6148
5131 Shattuck Avenue, Oakland, California

Date: 03-17-98

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	Oil & Grease SM 5520C	TRPH EPA 418.1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L
MW-1	03-20-95	108.03	15.75	92.28	ND	SW	0.02	03-20-95	830	140	5	41	110	--	--	--	--	--
MW-1	06-06-95	108.03	17.68	90 35	ND	SW	0.016	06-06-95	210	30	<0.5	7.3	16	--	--	--	--	--
MW-1	08-24-95	107.80	17.45	90 35	ND	SW	0 014	08-24-95	Not sampled: well was inaccessible due to construction									
MW-1	11-16-95	107.80	17.64	90.16	ND	SW	0 012	11-16-95	<50	5.6	<0.5	1 4	1.2	55	--	--	--	--
MW-1	02-27-96	107.80	15.21	92.59	ND	SW	0.016	02-27-96	1400	240	88	44	110	200	--	--	--	--
MW-1	05-15-96	107.80	17.53	90.27	ND	SW	0 015	05-15-96	Not sampled well sampled semi-annually, during the first and third quarter									
MW-1	08-14-96	107.80	17.15	90 65	ND	SW	0.021	08-14-96	98	18	<0.5	1.9	1	45	--	--	--	--
MW-1	11-11-96	107.80	17.78	90.02	ND	SW	0.015	11-11-96	Not sampled well sampled semi-annually, during the first and third quarter									
MW-1	03-25-97	107.80	17.68	90.12	ND	SSW	0 018	03-25-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	--
MW-1	05-15-97	107.80	17 91	89.89	ND	SSW	0.014	05-15-97	Not sampled. well sampled semi-annually, during the first and third quarter									
MW-1	10-26-97	107.80	18.85	88.95	ND	SW	0.009	10-26-97	<50	<0 5	<0 5	<0.5	<0.5	<3	--	--	--	--
MW-1	11-10-97	107 80	18 10	89.70	ND	SSW	0 014	11-10-97	<50	<0 5	<0 5	<0.5	<0.5	4	--	--	--	--
MW-2	03-20-95	107 43	15 50	91.93	ND#	SW	0.02	03-20-95	Not sampled: floating product entered well during purging									
MW-2	06-06-95	107 43	17 43	90.00	ND	SW	0.016	06-06-95	1200	60	21	35	140	--	--	--	--	--
MW-2	08-24-95	107 28	17.22	90 06	ND	SW	0.014	08-24-95	Not sampled well was inaccessible due to construction									
MW-2	11-16-95	107 28	17.36	89 92	ND	SW	0.012	11-16-95	360	45	1 3	7.1	7.5	210	--	--	--	--
MW-2	02-27-96	107.28	14 82	92.46	ND	SW	0.016	02-27-96	8900	1400	980	150	550	940	--	--	--	--
MW-2	05-15-96	107 28	17 40	89.88	ND	SW	0.015	05-15-96	480	82	48	8	48	87	--	--	--	--
MW-2	08-14-96	107.28	17.00	90.28	ND	SW	0.021	08-14-96	130	22	4	2	9	120	--	--	--	--
MW-2	11-11-96	107 28	17 55	89.73	ND	SW	0.015	11-11-96	1200	150	120	21	160	110	--	--	--	--
MW-2	03-25-97	107.28	17.32	89.96	ND	SSW	0.018	03-25-97	670	23	58	13	120	28	--	--	--	--
MW-2	05-15-97	107.28	17 61	89.67	ND	SSW	0.014	05-15-97	<50	<0 5	<0 5	<0.5	<0.5	23	--	--	--	--
MW-2	10-26-97	107.28	18 43	88.85	ND	SW	0.009	10-26-97	<50	<0 5	<0 5	<0.5	<0.5	<3	--	--	--	--
MW-2	11-10-97	107.28	17 84	89.44	ND	SSW	0.014	11-10-97	<100^	<1^	<1^	<1^	1	74	--	--	--	--

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995 - Present**

ARCO Service Station 6148
5131 Shattuck Avenue, Oakland, California

Date: 03-17-98

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	Oil & Grease SM 5520C	TRPH EPA 418.1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L
MW-3	03-20-95	107.77	15.60	92.17	ND	SW	0.02	03-20-95	29000	880	190	760	2000	--	--	--	16	--
MW-3	06-06-95	107 77	17.54	90 23	ND	SW	0.016	06-06-95	22000	450	54	380	1300	--	--	--	7 1	--
MW-3	08-24-95	107 61	17 42	90.19	ND	SW	0.014	08-24-95	Not sampled: well was inaccessible due to construction									
MW-3	11-16-95	107.61	17 58	90.03	ND	SW	0 012	11-16-95	13000	210	<20	320	1000	790	--	--	8 3	--
MW-3	02-27-96	107.61	15 03	92.58	ND	SW	0 016	02-27-96	9700	94	15	290	720	430	--	--	10	--
MW-3	05-15-96	107.61	17.35	90.26	ND	SW	0.015	05-15-96	5600	66	12	37	67	230	--	--	--	--
MW-3	08-14-96	107.61	17.10	90.51	ND	SW	0.021	08-14-96	830	17	<1*	8	7	110	--	--	--	--
MW-3	11-11-96	107.61	17.73	89 88	ND	SW	0.015	11-11-96	500	28	3	12	13	150	--	--	--	--
MW-3	03-25-97	107 61	17.99	89 62	ND	SSW	0.018	03-25-97	<50	<0.5	<0.5	<0.5	<0 5	94	--	--	--	--
MW-3	05-15-97	107 61	17.84	89 77	ND	SSW	0.014	05-15-97	<50	<0 5	<0.5	<0.5	<0.5	65	--	--	--	--
MW-3	10-26-97	107.61	18 50	89.11	ND	SW	0.009	10-26-97	220	4	<1^	<1^	<1^	160	--	--	--	--
MW-3	11-10-97	107.61	18.00	89.61	ND	SSW	0.014	11-10-97	350	8	<2^	3	3	230	--	--	--	--
MW-4	03-20-95	106 58	13.85	92.73	ND	SW	0.02	03-20-95	88	1	<0.5	<0.5	0.7	--	--	--	--	--
MW-4	06-06-95	106.58	15.70	90 88	ND	SW	0.016	06-06-95	<50	<0 5	<0.5	<0 5	<0 5	--	--	--	--	--
MW-4	08-24-95	106.71	15.86	90 85	ND	SW	0.014	08-24-95	Not sampled· well was inaccessible due to construction									
MW-4	11-16-95	106.71	16.10	90.61	ND	SW	0.012	11-16-95	<50	<0 5	<0 5	<0 5	<0.5	6	--	--	--	--
MW-4	02-27-96	106.71	13 72	92.99	ND	SW	0 016	02-27-96	<50	<0.5	<0.5	<0 5	<0.5	10	--	--	--	--
MW-4	05-15-96	106 71	15.90	90.81	ND	SW	0 015	05-15-96	Not sampled: well sampled semi-annually, during the first and third quarter									
MW-4	08-14-96	106.71	15.68	91 03	ND	SW	0.021	08-14-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	--
MW-4	11-11-96	106.71	16 19	90 52	ND	SW	0.015	11-11-96	Not sampled: well sampled semi-annually, during the first and third quarter									
MW-4	03-25-97	106.71	16 10	90.61	ND	SSW	0.018	03-25-97	<50	<0 5	<0.5	<0.5	<0 5	<3	--	--	--	--
MW-4	05-15-97	106.71	16.38	90.33	ND	SSW	0.014	05-15-97	Not sampled well sampled semi-annually, during the first and third quarter									
MW-4	10-26-97	106 71	17.78	88.93	ND	SW	0.009	10-26-97	<50	<0.5	<0.5	<0 5	<0.5	<3	--	--	--	--
MW-4	11-10-97	106 71	16.43	90 28	ND	SSW	0.014	11-10-97	Not sampled: well sampled semi-annually, during the first and third quarter									

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995 - Present**

ARCO Service Station 6148
5131 Shattuck Avenue, Oakland, California

Date: 03-17-98

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	Oil & Grease SM 5520C	TRPH EPA 418 1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L
MW-5	03-20-95	106.68	14.92	91 76	ND	SW	0.02	03-20-95	21000	6900	450	800	1300	--	--	--	--	--
MW-5	06-06-95	106.68	16.61	90 07	ND	SW	0.016	06-06-95	6500	1700	<20	120	69	--	--	--	--	--
MW-5	08-24-95	106.60	16.47	90 13	ND	SW	0.014	08-24-95	Not sampled: well was inaccessible due to construction									
MW-5	11-16-95	106.60	16.69	89.91	ND	SW	0.012	11-16-95	1800	470	<5	17	5	1000	--	--	--	--
MW-5	02-27-96	106.60	14.35	92.25	ND	SW	0.016	02-27-96	10000	1000	71	690	1000	440	450	--	--	--
MW-5	05-15-96	106 60	16.58	90 02	ND	SW	0.015	05-15-96	3400	350	6	72	20	220	--	--	--	--
MW-5	08-14-96	106 60	17 26	89.34	ND	SW	0.021	08-14-96	2100	130	2.7	47	4 7	220	--	--	--	--
MW-5	11-11-96	106 60	16.62	89.98	ND	SW	0 015	11-11-96	1200	31	1	8	2	130	--	--	--	--
MW-5	03-25-97	106.60	16 38	90.22	ND	SSW	0 018	03-25-97	<50	<0.5	<0.5	<0.5	<0 5	5	--	--	--	--
MW-5	05-15-97	106.60	16.54	90.06	ND	SSW	0 014	05-15-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	--
MW-5	10-26-97	106.60	17 60	89.00	ND	SW	0.009	10-26-97	<50	<0 5	<0.5	<0.5	<0.5	7	--	--	--	--
MW-5	11-10-97	106.60	16.78	89 82	ND	SSW	0.014	11-10-97	<50	<0 5	<0.5	<0.5	<0.5	24	--	--	--	--
MW-6	03-20-95	105 16	12.13	93.03	ND	SW	0.02	03-20-95	<50	<0.5	<0.5	<0.5	<0 5	--	--	--	--	--
MW-6	06-06-95	105 16	13 95	91.21	ND	SW	0.016	06-06-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--
MW-6	08-24-95	105 13	14 07	91.06	ND	SW	0.014	08-24-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	--
MW-6	11-16-95	105.13	14.34	90.79	ND	SW	0.012	11-16-95	<60	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--
MW-6	02-27-96	105.13	12.00	93.13	ND	SW	0 016	02-27-96	<50	<0 5	<0.5	<0 5	<0.5	<3	--	--	--	--
MW-6	05-15-96	105.13	14.10	91 03	ND	SW	0.015	05-15-96	Not sampled: well sampled annually, during the first quarter									
MW-6	08-14-96	105.13	13.70	91 43	ND	SW	0 021	08-14-96	Not sampled well sampled annually, during the first quarter									
MW-6	11-11-96	105 13	14.11	91 02	ND	SW	0.015	11-11-96	Not sampled: well sampled annually, during the first quarter									
MW-6	03-25-97	105.13	14.15	90.98	ND	SSW	0.018	03-25-97	<50	<0.5	<0.5	<0.5	<0 5	<3	--	--	--	--
MW-6	05-15-97	105.13	14 44	90.69	ND	SSW	0.014	05-15-97	Not sampled: well sampled annually, during the first quarter									
MW-6	10-26-97	105.13	16 02	89.11	ND	SW	0.009	10-26-97	Not sampled: well sampled annually, during the first quarter									
MW-6	11-10-97	105.13	14.52	90 61	ND	SSW	0 014	11-10-97	Not sampled well sampled annually, during the first quarter									

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995 - Present**

ARCO Service Station 6148
5131 Shattuck Avenue, Oakland, California

Date: 03-17-98

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	Oil & Grease SM 5520C	TRPH EPA 418.1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L
MW-7	03-20-95	107.08	12.32	94.76	ND	SW	0.02	03-20-95	<50	<0.5	<0 5	<0.5	<0.5	--	--	--	--	--
MW-7	06-06-95	107.08	14.59	92.49	ND	SW	0.016	06-06-95	Not sampled: well sampled semi-annually, during the first and third quarters									
MW-7	08-24-95	107.05	14.64	92.41	ND	SW	0.014	08-24-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	--
MW-7	11-16-95	107.05	15 30	91 75	ND	SW	0.012	11-16-95	Not sampled: well sampled semi-annually, during the first and third quarters									
MW-7	02-27-96	107.05	12 24	94 81	ND	SW	0.016	02-27-96	<50	<0.5	<0.5	<0 5	<0 5	<3	--	--	--	--
MW-7	05-15-96	107 05	14 65	92 40	ND	SW	0.015	05-15-96	Not sampled: well sampled annually, during the first quarter									
MW-7	08-14-96	107 05	14.35	92.70	ND	SW	0.021	08-14-96	Not sampled· well sampled annually, during the first quarter									
MW-7	11-11-96	107 05	14.92	92.13	ND	SW	0.015	11-11-96	Not sampled well sampled annually, during the first quarter									
MW-7	03-25-97	107.05	14.80	92.25	ND	SSW	0 018	03-25-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	--
MW-7	05-15-97	107.05	15.27	91.78	ND	SSW	0 014	05-15-97	Not sampled: well sampled annually, during the first quarter									
MW-7	10-26-97	107.05	16 68	90 37	ND	SW	0.009	10-26-97	Not sampled: well sampled annually, during the first quarter									
MW-7	11-10-97	107.05	15 37	91 68	ND	SSW	0 014	11-10-97	Not sampled: well sampled annually, during the first quarter									

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995 - Present**

ARCO Service Station 6148
5131 Shattuck Avenue, Oakland, California

Date: 03-17-98

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	Oil & Grease SM 5520C	TRPH EPA 418.1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L

ft-MSL: elevation in feet, relative to mean sea level
MWN: ground-water flow direction and gradient apply to the entire monitoring well network
ft/ft: foot per foot
TPHG. total petroleum hydrocarbons as gasoline, California DHS LUFT Method
µg/L: micrograms per liter
EPA: United States Environmental Protection Agency
MTBE: Methyl tert-butyl ether
SM: standard method
mg/L milligrams per liter
TRPH: total recoverable petroleum hydrocarbons
TPHD total petroleum hydrocarbons as diesel, California DHS LUFT Method
ND. none detected
SW: southwest
SSW: south-southwest
floating product entered the well during purging
- - not analyzed or not applicable
^ method reporting limit was raised due to. (1) high analyte concentration requiring sample dilution, or (2) matrix interference
**: For previous historical groundwater elevation and analytical data please refer to *Fourth Quarter 1995 Groundwater Monitoring Program Results and Remediation System Performance Evaluation Report, ARCO Service Station 6148, Oakland, California,* (EMCON, March 4, 1996).

Table 3
Historical Groundwater Analytical Data
Volatile and Semivolatile Organic Compounds
1994 - Present**

ARCO Service Station 6148
5131 Shattuck Avenue, Oakland, California

Date: 03-17-98

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 5030/601						Semivolatile Organic Compounds by EPA Method 3510/8270			
		Tetrachloro-ethene	Trichloro-ethene	Chloroform	cis-1,2-Dichloro-ethene	Vinyl Chloride	1,1-Dichloro-ethane	Naphthalene	2-Methyl-naphthalene	Bis (2ethylhexyl) Phthalate	Di-n-octyl Phthalate
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-1	03-20-95	Not analyzed: sampling for additional parameters was discontinued									
MW-1	04-29-94	13	1.3	0 5	<0.5	<0 5	<0.5	--	--	--	--
MW-1	08-02-94	15	1.4	0 7	0.7	<0 5	<0.5	--	--	--	-
MW-1	11-16-94	12	1.1	0.5	1 2	<0.5	<0 5	--	--	--	--
MW-1	03-20-95	Not analyzed: sampling for additional parameters was discontinued									
MW-2	03-20-95	Not analyzed. sampling for additional parameters was discontinued									
MW-2	04-29-94	9.4	1.9	<0.5	2.2	<0 5	<0.5	--	--	--	--
MW-2	08-02-94	15	2	<0.5	2.9	<0.5	<0 5	--	--	--	--
MW-2	11-16-94	9.6	1 8	<0.5	2 1	<0.5	<0 5	--	--	--	--
MW-2	03-20-95	Not analyzed: sampling for additional parameters was discontinued									
MW-3	03-20-95	Not analyzed: sampling for additional parameters was discontinued									
MW-3	04-29-94	1.7	<0 5	<0.5	<0 5	<0.5	<0 5	110	50	<10	<10
MW-3	08-02-94	1	<0.5	<0.5	<0.5	<0.5	<0.5	120	53	10	<10
MW-3	11-16-94	1 3	<0.5	<0.5	<0.5	<0.5	<0.5	100	53	<10	<10
MW-3	03-20-95	Not analyzed: sampling for additional parameters was discontinued									
MW-4	03-20-95	Not analyzed: sampling for additional parameters was discontinued									
MW-4	04-29-94	1.9	<0.5	<0.5	<0.5	<0.5	<0 5	--	--	--	--
MW-4	08-02-94	<0.5	<0.5	<0.5	<0.5	<0.5	<0 5	--	--	--	--
MW-4	11-16-94	1.8	<0 5	<0.5	<0.5	<0 5	<0 5	--	--	--	--
MW-4	03-20-95	Not analyzed. sampling for additional parameters was discontinued									
MW-5	03-20-95	Not analyzed: sampling for additional parameters was discontinued									
MW-5	04-29-94	10	2.7	<0.5	2.4	<0 5	<0 5	--	--	--	--
MW-5	08-02-94	13	5.4	<0 5	5 7	<0 5	<0.5	--	--	--	--
MW-5	11-16-94	1.1	1	<0 5	3 5	1.3	<0.5	--	--	--	--
MW-5	03-20-95	Not analyzed: sampling for additional parameters was discontinued									

Table 3
Historical Groundwater Analytical Data
Volatile and Semivolatile Organic Compounds
1994 - Present**

ARCO Service Station 6148
5131 Shattuck Avenue, Oakland, California

Date: 03-17-98

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 5030/601						Semivolatile Organic Compounds by EPA Method 3510/8270			
		Tetrachloro-ethene	Trichloro-ethene	Chloroform	cis-1,2-Dichloro-ethene	Vinyl Chloride	1,1-Dichloro-ethane	Naphthalene	2-Methyl-naphthalene	Bis (2ethylhexyl) Phthalate	Di-n-octyl Phthalate
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-6	03-20-95	Not analyzed: sampling for additional parameters was discontinued									
MW-6	04-29-94	95	6 6	7.2	<2.5	<2 5	<2.5	- -	- -	- -	- -
MW-6	08-02-94	87	6 1	4 6	<2.5	<2 5	<2.5	- -	- -	- -	- -
MW-6	11-16-94	86	6.8	8 9	<2.5	<2 5	<2.5	- -	- -	- -	- -
MW-6	03-20-95	Not analyzed. sampling for additional parameters was discontinued									
MW-7	03-20-95	Not analyzed: sampling for additional parameters was discontinued									
MW-7	04-29-94	3.4	<0.5	1.1	<0.5	<0 5	<0.5	- -	- -	- -	- -
MW-7	08-02-94	3.3	<0 5	0.8	<0.5	<0 5	<0.5	- -	- -	- -	- -
MW-7	11-16-94	3.3	<0.5	<0.5	<0.5	<0.5	<0.5	- -	- -	- -	- -
MW-7	03-20-95	Not analyzed: sampling for additional parameters was discontinued									

EPA. United Statest Environmental Protection Agency
µg/L· micrograms per liter
ND. none detected
- -: not analyzed or not applicable
*. sample was analyzed for volatile organic compounds using USEPA Method 624 (only BTEX was detected)
**· For previous historical analytical data please refer to *Fourth Quarter 1995 Groundwater Monitoring Program Results and Remediation System Performance Evaluation Report, ARCO Service Station 6148, Oakland, California,* (EMCON, March 4, 1996).

Table 4
Historical Groundwater Analytical Data
Metals

ARCO Service Station 6148
5131 Shattuck Avenue, Oakland, California

Date 01-20-98

Well Designation	Water Sample FieldDate	Cadmium EPA 6010 µg/L	Chromium EPA 6010 µg/L	Lead EPA 7421 µg/L	Zinc EPA 6010 µg/L	Nickel EPA 6010 µg/L
MW-1	03-18-92	<3	5	3	31	<20
MW-1	06-12-92	--	--	--	--	--
MW-1	09-14-92	--	--	--	--	--
MW-1	10-07-92	--	--	--	--	--
MW-1	01-22-93	--	--	--	--	--
MW-1	04-14-93	<3	<5	3	25	<20
MW-1	09-30-93	Not analyzed: sampling for additional parameters was discontinued				
MW-2	03-18-92	<3	21	9	54	38
MW-2	06-12-92	Not analyzed sampling for additional parameters was discontinued				
MW-3	03-18-92	<3	67	27	156	113
MW-3	06-12-92	--	--	--	--	--
MW-3	09-14-92	--	--	--	--	--
MW-3	10-07-92	Not sampled, well contained floating product				
MW-3	01-22-93	<3	10	8	28	23
MW-3	04-14-93	<3	<5	3	25	<20
MW-3	09-30-93	<5	50	26	100	70
MW-3	11-16-93	Not analyzed sampling for additional parameters was discontinued				

Table 4
Historical Groundwater Analytical Data
Metals

ARCO Service Station 6148
5131 Shattuck Avenue, Oakland, California

Date: 01-20-98

Well Designation	Water Sample FieldDate	Cadmium EPA 6010 µg/L	Chromium EPA 6010 µg/L	Lead EPA 7421 µg/L	Zinc EPA 6010 µg/L	Nickel EPA 6010 µg/L
MW-4	11-12-92	Not analyzed. sampling for additional parameters was not initiated				
MW-5	11-12-92	Not analyzed: sampling for additional parameters was not initiated				
MW-6	11-12-92	Not analyzed: sampling for additional parameters was not initiated				
MW-7	11-12-92	Not analyzed: sampling for additional parameters was not initiated				
AS-1	09-30-93	Not analyzed sampling for additional parameters was not initiated				
AS-2	08-11-95	Not analyzed: sampling for additional parameters was not initiated				
AS-3	08-11-95	Not analyzed. sampling for additional parameters was not initiated				
AS-4	08-11-95	Not analyzed: sampling for additional parameters was not initiated				
AS-5	08-11-95	Not analyzed: sampling for additional parameters was not initiated				

EPA: United Statest Environmental Protection Agency
µg/L: micrograms per liter
- - : not analyzed

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 6148
Location: 5131 Shattuck Avenue
Oakland, California

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Vapor Treatment Unit: ThermTech Model CATVAC-10E electric/ catalytic oxidizer

Start-Up Date: 09-27-95
Operation and Performance Data From: 09-27-95
To: 01-01-98
System was shut down on 10-3-96.

Date Begin:		09-27-96	10-01-95	01-01-96	02-01-96	03-01-96
Date End:		10-01-95	01-01-96	02-01-96	03-01-96	04-01-96
Mode of Oxidation:		Cat-ox	Cat-ox	Cat-ox	Cat-ox	Cat-ox
Days of Operation:		3	11	16	7	11
Days of Downtime:		1	81	15	22	20
Average Vapor Concentrations (1)						
Well Field Influent:	ppmv (2) as gasoline	3800	1200	670	230	320
	mg/m3 (3) as gasoline	14000	4400	2790	830	1300
	ppmv as benzene	81	19	NA (13)	0.6	1.6
	mg/m3 as benzene	260	61	NA	2	5.2
System Influent:	ppmv as gasoline	1800	600	415	230	320
	mg/m3 as gasoline	6700	2200	1730	830	1300
	ppmv as benzene	41	11	NA	0.6	1.6
	mg/m3 as benzene	130	34	NA	2	5.2
System Effluent:	ppmv as gasoline	52	30	3.8*	21	26
	mg/m3 as gasoline	190	110	20	76	110
	ppmv as benzene	1 1	0.5	NA	<0.1	<0 1
	mg/m3 as benzene	3.5	1 5	NA	<0 5	<0.5
Average Well Field Flow Rate (4), scfm (5):		75 0	104.0	124 6	128.2	126.4
Average System Influent Flow Rate (4), scfm.		103.6	132.3	111.9	128 2	126.4
Average Destruction Efficiency (6), percent (7):		97.2	95 0	98.8	90 8	91.5
Average Emission Rates (8), pounds per day (9)						
Gasoline:		1.77	1.31	0.20	0.88	1.25
Benzene:		0.03	0.02	0.00	0.01	0.01
Operating Hours This Period·		74.9	255 3	381 7	157.2	253.0
Operating Hours To Date.		74.9	330.2	711.9	869.1	1122.2
Pounds/ Hour Removal Rate, as gasoline (10):		3.93	1.71	1.30	0.40	0.62
Pounds Removed This Period, as gasoline (11):		294 4	437 3	496.6	62 6	155.6
Pounds Removed To Date, as gasoline:		294.4	731.7	1228 3	1290.9	1446.5
Gallons Removed This Period, as gasoline (12):		47.5	70 5	80.1	10.1	25.1
Gallons Removed To Date, as gasoline:		47.5	118 0	198.1	208.2	233.3

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 6148
Location: 5131 Shattuck Avenue
Oakland, California

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Vapor Treatment Unit: ThermTech Model CATVAC-10E electric/ catalytic oxidizer

Start-Up Date: 09-27-95
Operation and Performance Data From: 09-27-95
To: 01-01-98
System was shut down on 10-3-96.

Date Begin:		04-01-96	05-01-96	06-01-96	07-01-96	08-01-96
Date End:		05-01-96	06-01-96	07-01-96	08-01-96	09-01-96
Mode of Oxidation:		Cat-ox	Cat-ox	Cat-ox	Cat-ox	Cat-ox
Days of Operation:		22	3	3	20	11
Days of Downtime:		8	28	27	11	20
Average Vapor Concentrations (1)						
Well Field Influent:	ppmv (2) as gasoline	190	160	180	170	170
	mg/m3 (3) as gasoline	760	650	740	690	710
	ppmv as benzene	0.9	0.6	<1	0.4	<1
	mg/m3 as benzene	3	2	<2 5	1.3	<2 5
System Influent:	ppmv as gasoline	190	160	180	170	170
	mg/m3 as gasoline	760	650	740	690	710
	ppmv as benzene	0.9	0.6	<1	0.4	<1
	mg/m3 as benzene	3	2	<2.5	1 3	<2.5
System Effluent:	ppmv as gasoline	10	10	<5	6	9
	mg/m3 as gasoline	41	39	<20	23	38
	ppmv as benzene	<0.2	<0.2	<0.2	<0 2	<0.2
	mg/m3 as benzene	<0.5	<0.5	<0.5	<0.5	<0 5
Average Well Field Flow Rate (4), scfm (5):		100.3	91 8	116.7	125.7	125.4
Average System Influent Flow Rate (4), scfm:		100.3	91.8	116.7	125.7	125.4
Average Destruction Efficiency (6), percent (7).		94.6	94.0	97.3	96 7	94.6
Average Emission Rates (8), pounds per day (9)						
Gasoline:		0.37	0.32	0.21	0.26	0.43
Benzene:		0.00	0.00	0.01	0 01	0.01
Operating Hours This Period:		532.5	72.9	83 7	478.9	255 2
Operating Hours To Date.		1654.6	1727.6	1811 3	2290 1	2545.3
Pounds/ Hour Removal Rate, as gasoline (10):		0.29	0.22	0.32	0.32	0 33
Pounds Removed This Period, as gasoline (11):		151.9	16.3	27.1	155 4	85.0
Pounds Removed To Date, as gasoline:		1598.4	1614.7	1641.8	1797.2	1882.2
Gallons Removed This Period, as gasoline (12):		24.5	2 6	4.4	25.1	13 7
Gallons Removed To Date, as gasoline:		257 8	260.5	264.8	289.9	303.6

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 6148
Location: 5131 Shattuck Avenue
Oakland, California

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Vapor Treatment Unit: ThermTech Model CATVAC-10E electric/ catalytic oxidizer

Start-Up Date: 09-27-95
Operation and Performance Data From: 09-27-95
To: 01-01-98
System was shut down on 10-3-96.

Date Begin:		09-01-96	10-01-96	11-01-96	12-01-96	01-01-97
Date End:		10-01-96	11-01-96	12-01-96	01-01-97	04-01-97
Mode of Oxidation:		Cat-ox	Cat-ox	Cat-ox	Cat-ox	Cat-ox
Days of Operation:		6	0	0	0	0
Days of Downtime:		24	31	30	31	90
Average Vapor Concentrations (1)						
Well Field Influent:	ppmv (2) as gasoline	NA	450	NA	NA	NA
	mg/m3 (3) as gasoline	NA	1900	NA	NA	NA
	ppmv as benzene	NA	<1	NA	NA	NA
	mg/m3 as benzene	NA	<4	NA	NA	NA
System Influent:	ppmv as gasoline	NA	330	NA	NA	NA
	mg/m3 as gasoline	NA	1400	NA	NA	NA
	ppmv as benzene	NA	<1	NA	NA	NA
	mg/m3 as benzene	NA	<4	NA	NA	NA
System Effluent:	ppmv as gasoline	NA	20	NA	NA	NA
	mg/m3 as gasoline	NA	83	NA	NA	NA
	ppmv as benzene	NA	<0 1	NA	NA	NA
	mg/m3 as benzene	NA	<0.4	NA	NA	NA
Average Well Field Flow Rate (4), scfm (5):		125.2	63.7	0.0	91 8	0.0
Average System Influent Flow Rate (4), scfm:		125.2	63.3	0 0	81.9	0.0
Average Destruction Efficiency (6), percent (7):		NA	94.1	NA	NA	NA
Average Emission Rates (8), pounds per day (9)						
Gasoline:		NA	0 47	NA	NA	NA
Benzene:		NA	0 00	NA	NA	NA
Operating Hours This Period:		140.7	7 5	0 0	0.6	0 0
Operating Hours To Date:		2686.0	2693 5	2693 5	2694.1	2694.1
Pounds/ Hour Removal Rate, as gasoline (10):		0.00	0.45	0.00	0.00	0.00
Pounds Removed This Period, as gasoline (11):		0.0	3.4	0.0	0.0	0.0
Pounds Removed To Date, as gasoline:		1882.2	1885.6	1885.6	1885 6	1885.6
Gallons Removed This Period, as gasoline (12):		0.0	0.5	0 0	0 0	0.0
Gallons Removed To Date, as gasoline:		303 6	304.2	304 2	304 2	304.2

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 6148
Location: 5131 Shattuck Avenue
Oakland, California

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Vapor Treatment Unit: ThermTech Model CATVAC-10E electric/ catalytic oxidizer

Start-Up Date 09-27-95
Operation and Performance Data From: 09-27-95
To: 01-01-98
System was shut down on 10-3-96.

Date Begin:		04-01-97	07-01-97	10-01-97	11-01-97
Date End:		07-01-97	10-01-97	11-01-97	12-01-97
Mode of Oxidation:		Cat-ox	Cat-ox	Cat-ox	Cat-ox
Days of Operation:		0	0	0	0
Days of Downtime:		91	92	31	30
Average Vapor Concentrations (1)					
Well Field Influent.	ppmv (2) as gasoline	NA	NA	680	NA
	mg/m3 (3) as gasoline	NA	NA	2800	NA
	ppmv as benzene	NA	NA	24	NA
	mg/m3 as benzene	NA	NA	78	NA
System Influent:	ppmv as gasoline	NA	NA	680	NA
	mg/m3 as gasoline	NA	NA	2800	NA
	ppmv as benzene	NA	NA	24	NA
	mg/m3 as benzene	NA	NA	78	NA
System Effluent:	ppmv as gasoline	NA	NA	61	NA
	mg/m3 as gasoline	NA	NA	250	NA
	ppmv as benzene	NA	NA	0.2	NA
	mg/m3 as benzene	NA	NA	0 5	NA
Average Well Field Flow Rate (4), scfm (5):		0 0	0.0	0.0	0.0
Average System Influent Flow Rate (4), scfm:		0.0	0.0	0 0	0.0
Average Destruction Efficiency (6), percent (7)		NA	NA	91 1	NA
Average Emission Rates (8), pounds per day (9)					
Gasoline:		NA	NA	0.00	NA
Benzene:		NA	NA	0.00	NA
Operating Hours This Period:		0.0	0.0	1.4	2.1
Operating Hours To Date:		2694.1	2694.1	2695.5	2697.5
Pounds/ Hour Removal Rate, as gasoline (10):		0.00	0 00	0.00	0.00
Pounds Removed This Period, as gasoline (11):		0.0	0 0	0.0	0 0
Pounds Removed To Date, as gasoline:		1885 6	1885.6	1885 6	1885.6
Gallons Removed This Period, as gasoline (12).		0.0	0.0	0 0	0.0
Gallons Removed To Date, as gasoline:		304 2	304.2	304.2	304 2

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 6148	Vapor Treatment Unit: ThermTech Model
Location: 5131 Shattuck Avenue	CATVAC-10E electric/
Oakland, California	catalytic oxidizer
Consultant: EMCON	Start-Up Date: 09-27-95
1921 Ringwood Avenue	Operation and Performance Data From: 09-27-95
San Jose, California	To: 01-01-98
	System was shut down on 10-3-96.

Date Begin:		12-01-97
Date End:		01-01-98
Mode of Oxidation:		Cat-ox
Days of Operation:		0
Days of Downtime:		31
Average Vapor Concentrations (1)		
Well Field Influent:	ppmv (2) as gasoline	NA
	mg/m3 (3) as gasoline	NA
	ppmv as benzene	NA
	mg/m3 as benzene	NA
System Influent:	ppmv as gasoline	NA
	mg/m3 as gasoline	NA
	ppmv as benzene	NA
	mg/m3 as benzene	NA
System Effluent:	ppmv as gasoline	NA
	mg/m3 as gasoline	NA
	ppmv as benzene	NA
	mg/m3 as benzene	NA
Average Well Field Flow Rate (4), scfm (5):		0.0
Average System Influent Flow Rate (4), scfm:		0.0
Average Destruction Efficiency (6), percent (7):		NA
Average Emission Rates (8), pounds per day (9)		
Gasoline:		NA
Benzene:		NA
Operating Hours This Period:		0.0
Operating Hours To Date:		2697 5
Pounds/ Hour Removal Rate, as gasoline (10):		0.00
Pounds Removed This Period, as gasoline (11):		0.0
Pounds Removed To Date, as gasoline:		1885.6
Gallons Removed This Period, as gasoline (12):		0.0
Gallons Removed To Date, as gasoline:		304.2

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 6148	Vapor Treatment Unit: ThermTech Model
Location: 5131 Shattuck Avenue	CATVAC-10E electric/
Oakland, California	catalytic oxidizer
Consultant: EMCON	Start-Up Date: 09-27-95
1921 Ringwood Avenue	Operation and Performance Data From: 09-27-95
San Jose, California	To: 01-01-98
	System was shut down on 10-3-96.

CURRENT REPORTING PERIOD:	10-01-97	to	01-01-98
DAYS / HOURS IN PERIOD:	92	2208 0	
DAYS / HOURS OF OPERATION·	0	0 2	
DAYS / HOURS OF DOWN TIME:	92	2207.9	
PERCENT OPERATIONAL·		0.0 %	
PERIOD POUNDS REMOVED:	0 0		
PERIOD GALLONS REMOVED.	0.0		
AVERAGE WELL FIELD FLOW RATE (scfm):		0.0	
AVERAGE SYSTEM INFLUENT FLOW RATE (scfm):		0.0	

1. Average concentrations are based on discrete sample results reported during the month, refer to Appendix B for discrete sample results. For the period of January 1, 1996 to February 1, 1996, laboratory analytical results were unavailable The average concentrations were based on photoionization d (PID) field readings taken during the month of January 1996.
2. ppmv. parts per million by volume
3. mg/m3: milligrams per cubic meter
4. Average flow rates (time weighted average) are based on instantaneous flow rates recorded during the month; refer to Appendix B for instantaneous flow data
5. scfm: flow in standard cubic feet per minute at one atmosphere and 70 degrees Fahrenheit
6. Average destruction efficiencies are calculated using monthly average concentrations; refer to Appendix B for instantaneous destruction efficiency data
7. destruction efficiency, percent = ([system influent concentration (as gasoline in mg/m3) - system effluent concentration (as gasoline in mg/m3)] / system influent concentration (as gasoline in mg/m3)) x 100 percent
8. Average emission rates are calculated using monthly average concentrations and flow rates, refer to Appendix B for instantaneous emission rate data
9. emission rates (pounds per day) = system effluent concentration (as gasoline or benzene in mg/m3) x system influent flow rate (scfm) x 0.02832 m3/ft3 x 1440 minutes/day x 1 pound/454,000 mg
10. pounds/ hour removal rate (as gasoline) = well field influent concentration (as gasoline in mg/m3) x well field influent flow rate (scfm) x 0.02832 m3/ft3 x 60 minutes/hour x 1 pound/454,000 mg
11. pounds removed this period (as gasoline) = pounds/ hour removal rate x hours of operation
12. gallons removed this period (as gasoline) = pounds removed this period (as gasoline) x 0 1613 gallons/pound of gasoline
13 not available

Table 6
Soil-Vapor Extraction Well Data

ARCO Service Station 6148
5131 Shattuck Avenue, Oakland, California

Date: 01-20-98

Date	Well Identification											
	VW-1			VW-2			VW-3			VW-4		
	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O
For SVE monitoring well data prior to June 1, 1996, please refer to the second quarter 1996 groundwater monitoring report for this site.												
07-10-96	open	361 PID	8.0	open	302 PID	8 0	open	247 PID	8 0	closed	54 PID	0.0
08-05-96	open	NA	8 0	open	NA	7.0	open	NA	6.0	closed	NA	0 0
08-12-96	closed	NA	0 0	closed	NA	0.0	closed	NA	0.0	closed	NA	0.0
09-27-96	open (b)	NA	NA	open (b)	NA	NA	open	NA	NA	closed	NA	NA
09-30-96	open	200 FID	NA	open	220 FID	NA	open	800 FID	NA	open	>1000 FID	NA
10-03-96	open	NA	9.0	open	NA	10.0	open	NA	9 0	open	NA	10.0
12-04-96	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA
01-08-97	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA	closed	NA	NA
02-04-97	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA	closed	NA	NA
03-07-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
05-16-97	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA	closed	NA	NA
07-22-97	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA	closed	NA	NA
08-04-97	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA	closed	NA	NA
08-26-97	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA	closed	NA	NA
09-26-97	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA	closed	NA	NA
10-17-97	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA	closed	NA	NA
11-05-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
11-13-97	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA	closed	NA	NA
12-15-97	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA	closed	NA	NA

TVHG: concentration of total volatile hydrocarbons as gasoline
ppmv: parts per million by volume
in-H2O: inches of water
open: open to the system
open (b): open to the system and bubbling air at 1 scfm per well
passive: open to the atmosphere
closed: closed to the system and atmosphere
NA: not analyzed or not measured
FID: TVHG concentration was measured with a portable flame ionization detector
LAB: TVHG concentration was analyzed in the laboratory
PID: TVHG concentration was measured with a portable photoionization detector

Table 6
Soil-Vapor Extraction Well Data

ARCO Service Station 6148
5131 Shattuck Avenue, Oakland, California

Date: 01-20-98

Date	Well Identification											
	VW-5			VW-6			VW-7			VW-8		
	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O
For SVE monitoring well data prior to June 1, 1996, please refer to the second quarter 1996 groundwater monitoring report for this site.												
07-10-96	open	233 PID	8 0	open	371 PID	8.0	open	511 PID	8.0	open	113 PID	8.0
08-05-96	open	NA	8.0	open	NA	8.0	open	NA	6.0	open	NA	8.0
08-12-96	closed	NA	0.0	closed	NA	0 0	closed	NA	0.0	closed	NA	0.0
09-27-96	open	NA	NA	open (b)	NA	NA	open (b)	NA	NA	open	NA	NA
09-30-96	closed	48 FID	NA	closed	140 FID	NA	open	480 FID	NA	closed	120 FID	NA
10-03-96	closed	NA	NA	closed	NA	NA	open	NA	8.0	closed (b)	NA	0 0
12-04-96	closed	NA	NA	closed	NA	NA	closed (b)	NA	NA	closed	NA	NA
01-08-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
02-04-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
03-07-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
05-16-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
07-22-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
08-04-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
08-26-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
09-26-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
10-17-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
11-05-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
11-13-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
12-15-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA

TVHG: concentration of total volatile hydrocarbons as gasoline
ppmv: parts per million by volume
in-H2O inches of water
open: open to the system
open (b). open to the system and bubbling air at 1 scfm per well
passive: open to the atmosphere
closed: closed to the system and atmosphere
NA not analyzed or not measured
FID: TVHG concentration was measured with a portable flame ionization detector
LAB. TVHG concentration was analyzed in the laboratory
PID· TVHG concentration was measured with a portable photoionization detector

Table 6
Soil-Vapor Extraction Well Data

ARCO Service Station 6148
5131 Shattuck Avenue, Oakland, California

Date: 01-20-98

Date	Well Identification											
	VW-9			VW-10			MW-1			MW-5		
	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O
For SVE monitoring well data prior to June 1, 1996, please refer to the second quarter 1996 groundwater monitoring report for this site.												
07-10-96	open	173 PID	8.0	closed	51 PID	0.0	closed	50 PID	0.0	closed	50 PID	0.0
08-05-96	open	NA	6.0	closed	NA	0.0	closed	NA	0.0	closed	NA	0.0
08-12-96	closed	NA	0.0	closed	NA	0.0	closed	NA	0 0	closed	NA	0 0
09-27-96	open (b)	NA	NA	closed	NA	NA	closed (b)	NA	NA	open (b)	NA	NA
09-30-96	open	600 FID	NA	open	>1000 FID	NA	closed	NA	NA	open	250 FID	NA
10-03-96	open	NA	9.0	open	NA	8.0	closed (b)	NA	0.0	open	NA	8.0
12-04-96	closed (b)	NA	NA	closed	NA	NA	closed	NA	NA	closed (b)	NA	NA
01-08-97	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA
02-04-97	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA
03-07-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
05-16-97	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA
07-22-97	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA
08-04-97	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA
08-26-97	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA
09-26-97	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA
10-17-97	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA
11-05-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
11-13-97	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA
12-15-97	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA	closed (b)	NA	NA

TVHG: concentration of total volatile hydrocarbons as gasoline
ppmv: parts per million by volume
in-H2O: inches of water
open: open to the system
open (b): open to the system and bubbling air at 1 scfm per well
passive: open to the atmosphere
closed: closed to the system and atmosphere
NA: not analyzed or not measured
FID: TVHG concentration was measured with a portable flame ionization detector
LAB: TVHG concentration was analyzed in the laboratory
PID: TVHG concentration was measured with a portable photoionization detector

Table 7
Air-Sparge and Air-Bubbling Systems
Operation and Performance Data

Facility Number: 6148
Location: 5131 Shattuck Avenue
Oakland, California

Air-Sparge and Air-Bubbling Unit:
5 Hp Powerex Rotary Oilless Compressor

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Air-Bubbling Start-Up Date: 03-19-96
Air-Sparge Start-Up Date: 06-07-96
Operation and Performance Data From: 03-19-96
To: 01-01-98

Date Begin:	03-19-96	03-19-96	04-02-96	05-08-96	05-16-96	06-07-96
Date End:		04-02-96	05-08-96	05-16-96	06-07-96	06-28-96
Air-Bubbling Well Status:						
	See Table 6 for the status of the 12 SVE/air-bubbling wells. Air is bubbled at an average flow rate of 1 scfm per well.					
MW-2	off	on	on	off	on	on
MW-3	off	on	on	off	on	on
MW-4	off	off	off	off	off	on
Air-Sparge Well Status:						
AS-1	off	off	off	off	off	on
AS-2	off	off	off	off	off	on
AS-3	off	off	off	off	off	on
AS-4	off	off	off	off	off	on
AS-5	off	off	off	off	off	on
Air-Bubbling Well Pressure (psig) (1):						
MW-1	--(4)	--	--	--	--	--
MW-2	--	2.5	2.5	--	2.5	--
MW-3	--	3.0	3.0	--	3.0	--
MW-4	--	--	--	--	--	--
MW-5	--	--	--	--	--	--
Air-Sparge Well Pressure (psig) (1):						
AS-1	--	--	--	--	--	--
AS-2	--	--	--	--	--	--
AS-3	--	--	--	--	--	--
AS-4	--	--	--	--	--	--
AS-5	--	--	--	--	--	--
Total Air-Sparge and Air-Bubbling Pressure (psig) (1):	--	20.0	20.0	0.0	20.0	20.0
Total Air-Sparge and Air-Bubbling Flow Rate (scfm) (2):	--	--	--	--	--	--
Dissolved Oxygen (ppm) (3):						
Air-Bubbling Wells:						
MW-1	--	--	--	--	--	--
MW-2	--	--	--	--	--	--
MW-3	--	--	--	--	--	--
MW-4	--	--	--	--	--	--
MW-5	--	--	--	--	--	--

Table 7
Air-Sparge and Air-Bubbling Systems
Operation and Performance Data

Facility Number: 6148
Location: 5131 Shattuck Avenue
Oakland, California

Air-Sparge and Air-Bubbling Unit:
5 Hp Powerex Rotary Oilless Compressor

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Air-Bubbling Start-Up Date: 03-19-96
Air-Sparge Start-Up Date: 06-07-96
Operation and Performance Data From: 03-19-96
To: 01-01-98

Date Begin:	06-28-96	07-10-96	08-12-96	09-27-96	10-01-96	10-03-96
Date End:	07-10-96	08-12-96	09-27-96	10-01-96	10-03-96	10-07-96
Air-Bubbling Well Status:	See Table 6 for the status of the 12 SVE/air-bubbling wells. Air is bubbled at an average flow rate of 1 scfm per well.					
MW-2	on	on	off	on	on	on
MW-3	on	on	off	on	on	on
MW-4	on	on	off	on	on	on
Air-Sparge Well Status:						
AS-1	on	on	off	off	on	off
AS-2	on	on	off	off	on	off
AS-3	on	on	off	off	on	off
AS-4	on	on	off	off	on	off
AS-5	on	on	off	off	on	off
Air-Bubbling Well Pressure (psig) (1):						
MW-1	--	--	--	--	--	0.0
MW-2	4.0	5.0	0.0	2.6	2.0	0.0
MW-3	4.0	5.5	0.0	2.5	2.5	0.0
MW-4	4.0	5.5	0.0	4.1	3.5	0.0
MW-5	--	--	--	--	--	3.0
Air-Sparge Well Pressure (psig):						
AS-1	4.0	5.0	0.0	0.0	8.0	0.0
AS-2	3.0	5.5	0.0	0.0	4.0	0.0
AS-3	4.0	4.0	0.0	0.0	7.0	0.0
AS-4	3.0	4.5	0.0	0.0	4.0	0.0
AS-5	3.5	5.0	0.0	0.0	12.0	0.0
Total Air-Sparge and Air-Bubbling Pressure (psig):	20.0	30.0	0.0	40.0	32.0	50.0
Total Air-Sparge and Air-Bubbling Flow Rate (scfm) (2):	--	--	--	--	--	--
Dissolved Oxygen (ppm) (3):						
Air-Bubbling Wells:						
MW-1	--	--	--	--	--	--
MW-2	--	--	--	--	--	--
MW-3	--	--	--	--	--	--
MW-4	--	--	--	--	--	--
MW-5	--	--	--	--	--	--

Table 7
Air-Sparge and Air-Bubbling Systems
Operation and Performance Data

Facility Number: 6148
Location: 5131 Shattuck Avenue
Oakland, California

Air-Sparge and Air-Bubbling Unit:
5 Hp Powerex Rotary Oilless Compressor

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Air-Bubbling Start-Up Date: 03-19-96
Air-Sparge Start-Up Date: 06-07-96
Operation and Performance Data From: 03-19-96
To: 01-01-98

Date Begin:	10-07-96	11-06-96	12-04-96	01-08-97	02-04-97	03-07-97
Date End:	11-06-96	12-04-96	01-08-97	02-04-97	03-07-97	04-01-97
Air-Bubbling Well Status:						
	See Table 6 for the status of the 12 SVE/air-bubbling wells. Air is bubbled at an average flow rate of 1 scfm per well.					
MW-2	on	on	on	on	on	on
MW-3	off	off	off	off	off	off
MW-4	off	off	off	off	off	off
Air-Sparge Well Status:						
AS-1	off	off	off	off	off	off
AS-2	off	off	off	off	off	off
AS-3	off	off	off	off	off	off
AS-4	off	off	off	off	off	off
AS-5	off	off	off	off	off	off
Air-Bubbling Well Pressure (psig) (1):						
MW-1	3.5	3.5	--	--	--	--
MW-2	3.0	3.0	--	3.5	3.5	--
MW-3	0.0	0.0	0.0	0.0	0.0	0.0
MW-4	0.0	0.0	0.0	0.0	0.0	0.0
MW-5	3.0	3.5	--	--	--	--
Air-Sparge Well Pressure (psig):						
AS-1	0.0	0.0	0.0	0.0	0.0	0.0
AS-2	0.0	0.0	0.0	0.0	0.0	0.0
AS-3	0.0	0.0	0.0	0.0	0.0	0.0
AS-4	0.0	0.0	0.0	0.0	0.0	0.0
AS-5	0.0	0.0	0.0	0.0	0.0	0.0
Total Air-Sparge and Air-Bubbling Pressure (psig):	50.0	0.0	60.0	--	--	--
Total Air-Sparge and Air-Bubbling Flow Rate (scfm) (2):	--	--	--	--	--	--
Dissolved Oxygen (ppm) (3):						
Air-Bubbling Wells:						
MW-1	--	--	--	--	--	--
MW-2	--	--	--	--	--	0.5
MW-3	--	--	--	--	--	0.5
MW-4	--	--	--	--	--	0.5
MW-5	--	--	--	--	--	--

Table 7
Air-Sparge and Air-Bubbling Systems
Operation and Performance Data

Facility Number: 6148
Location: 5131 Shattuck Avenue
Oakland, California

Air-Sparge and Air-Bubbling Unit:
5 Hp Powerex Rotary Oilless Compressor

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Air-Bubbling Start-Up Date: 03-19-96
Air-Sparge Start-Up Date: 06-07-96
Operation and Performance Data From: 03-19-96
To: 01-01-98

Date Begin:	04-01-97	05-01-97	06-01-97	07-01-97	07-22-97	08-04-97
Date End:	05-01-97	06-01-97	07-01-97	07-22-97	08-04-97	08-26-97
Air-Bubbling Well Status:						
	See Table 6 for the status of the 12 SVE/air-bubbling wells. Air is bubbled at an average flow rate of 1 scfm per well.					
MW-2	off	on	on	on	on	on
MW-3	off	on	on	on	on	on
MW-4	off	on	on	on	on	on
Air-Sparge Well Status:						
AS-1	off	off	off	off	off	off
AS-2	off	off	off	off	off	off
AS-3	off	off	off	off	off	off
AS-4	off	off	off	off	off	off
AS-5	off	off	off	off	off	off
Air-Bubbling Well Pressure (psig) (1):						
MW-1	0.0	--	--	--	--	--
MW-2	0.0	--	--	--	--	--
MW-3	0.0	0.0	0.0	0.0	0.0	0.0
MW-4	0.0	0.0	0.0	0.0	0.0	0.0
MW-5	0.0	--	--	--	--	--
Air-Sparge Well Pressure (psig):						
AS-1	0.0	0.0	0.0	0.0	0.0	0.0
AS-2	0.0	0.0	0.0	0.0	0.0	0.0
AS-3	0.0	0.0	0.0	0.0	0.0	0.0
AS-4	0.0	0.0	0.0	0.0	0.0	0.0
AS-5	0.0	0.0	0.0	0.0	0.0	0.0
Total Air-Sparge and Air-Bubbling Pressure (psig):	0.0	20.0	--	10.0	10.0	10.0
Total Air-Sparge and Air-Bubbling Flow Rate (scfm) (2):	0.0	16.0	--	--	--	16.0
Dissolved Oxygen (ppm) (3):						
Air-Bubbling Wells:						
MW-1	--	--	--	--	--	--
MW-2	--	0.5	--	--	--	--
MW-3	--	0.5	--	--	--	--
MW-4	--	--	--	--	--	--
MW-5	--	1.5	--	--	--	--

Table 7
Air-Sparge and Air-Bubbling Systems
Operation and Performance Data

Facility Number: 6148
Location: 5131 Shattuck Avenue
Oakland, California

Air-Sparge and Air-Bubbling Unit:
5 Hp Powerex Rotary Oilless Compressor

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Air-Bubbling Start-Up Date: 03-19-96
Air-Sparge Start-Up Date: 06-07-96
Operation and Performance Data From: 03-19-96
To: 01-01-98

Date Begin:	08-26-97	09-26-97	10-17-97	11-05-97	11-13-97
Date End:	09-26-97	10-17-97	11-05-97	11-13-97	12-15-97
Air-Bubbling Well Status:	See Table 6 for the status of the 12 SVE/air-bubbling wells. Air is bubbled at an average flow rate of 1 scfm per well.				
MW-2	on	on	on	on	on
MW-3	on	off	off	off	off
MW-4	on	off	off	off	off
Air-Sparge Well Status:					
AS-1	off	off	off	off	off
AS-2	off	off	off	off	off
AS-3	off	off	off	off	off
AS-4	off	off	off	off	off
AS-5	off	off	off	off	off
Air-Bubbling Well Pressure (psig) (1):					
MW-1	--	--	2.5	--	--
MW-2	--	--	2.0	--	--
MW-3	0.0	0.0	0.0	0.0	0.0
MW-4	0.0	0.0	0.0	0.0	0.0
MW-5	--	--	5.5	--	--
Air-Sparge Well Pressure (psig):					
AS-1	0.0	0.0	0.0	0.0	0.0
AS-2	0.0	0.0	0.0	0.0	0.0
AS-3	0.0	0.0	0.0	0.0	0.0
AS-4	0.0	0.0	0.0	0.0	0.0
AS-5	0.0	0.0	0.0	0.0	0.0
Total Air-Sparge and Air-Bubbling Pressure (psig):	10.0	10.0	10.0	10.0	10.0
Total Air-Sparge and Air-Bubbling Flow Rate (scfm) (2):	16.0	16.0	16.0	16.0	16.0
Dissolved Oxygen (ppm) (3):					
Air-Bubbling Wells:					
MW-1	--	--	--	--	--
MW-2	--	--	--	--	--
MW-3	--	--	--	--	--
MW-4	--	--	--	--	--
MW-5	--	--	--	--	--

Table 7
Air-Sparge and Air-Bubbling Systems
Operation and Performance Data

Facility Number: 6148	Air-Sparge and Air-Bubbling Unit:
Location: 5131 Shattuck Avenue Oakland, California	5 Hp Powerex Rotary Oilless Compressor
	Air-Bubbling Start-Up Date: 03-19-96
Consultant: EMCON	Air-Sparge Start-Up Date: 06-07-96
1921 Ringwood Avenue	Operation and Performance Data From: 03-19-96
San Jose, California	To: 01-01-98

Date Begin:	12-15-97
Date End:	01-01-98
Air-Bubbling Well Status:	See Table 6 for the status of the 12 SVE/air-bubbling wells. Air is bubbled at an average flow rate of 1 scfm per well.
MW-2	on
MW-3	off
MW-4	off
Air-Sparge Well Status:	
AS-1	off
AS-2	off
AS-3	off
AS-4	off
AS-5	off
Air-Bubbling Well Pressure (psig) (1):	
MW-1	- -
MW-2	- -
MW-3	0.0
MW-4	0.0
MW-5	- -
Air-Sparge Well Pressure (psig):	
AS-1	0.0
AS-2	0.0
AS-3	0.0
AS-4	0.0
AS-5	0.0
Total Air-Sparge and Air-Bubbling Pressure (psig):	10.0
Total Air-Sparge and Air-Bubbling Flow Rate (scfm) (2):	16.0
Dissolved Oxygen (ppm) (3):	
Air-Bubbling Wells:	
MW-1	- -
MW-2	- -
MW-3	- -
MW-4	- -
MW-5	- -

Table 7
Air-Sparge and Air-Bubbling Systems
Operation and Performance Data

Facility Number: 6148		Air-Sparge and Air-Bubbling Unit:	
Location: 5131 Shattuck Avenue Oakland, California		5 Hp Powerex Rotary Oilless Compressor	
		Air-Bubbling Start-Up Date:	03-19-96
Consultant: EMCON		Air-Sparge Start-Up Date:	06-07-96
1921 Ringwood Avenue		Operation and Performance Data From:	03-19-96
San Jose, California		To:	01-01-98

CURRENT REPORTING PERIOD:	10-01-97	to	01-01-98
DAYS / HOURS IN PERIOD:	92.0	2208	

1. psig: pounds per square inch gauge
2. scfm: standard cubic feet per minute at 14.7 psi and 70° F
3. ppm: parts per million
4. - - : not analyzed, not applicable, or not available

Base map from USGS 7.5' Quad. Maps:
Oakland East and Oakland West, California.
Photorevised 1980.

0 2000 4000

SCALE IN FEET

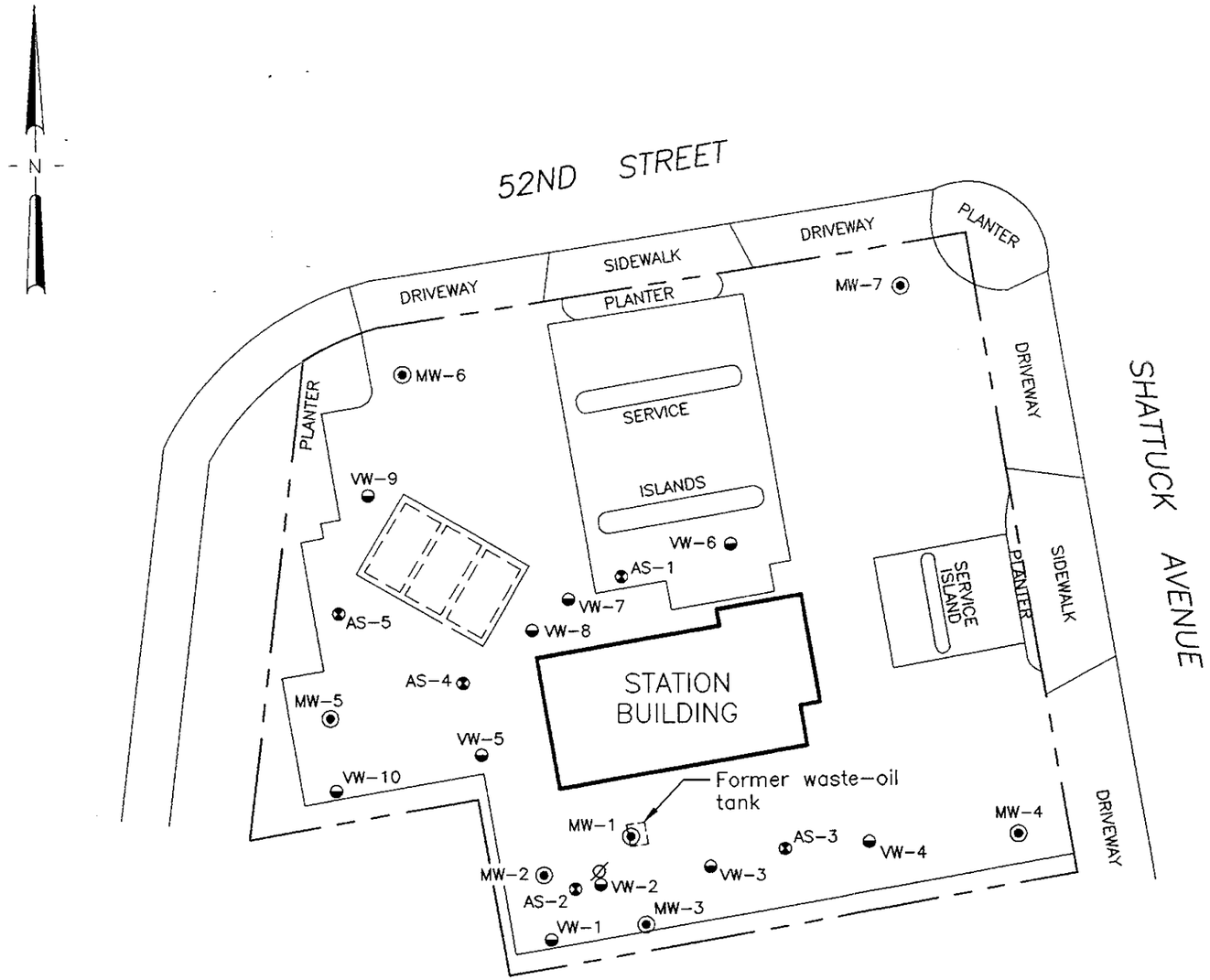
- N -

EMCON

DATE	NOV. 1997
DWN	KAJ
APP	
REV	
PROJECT NO.	805-135.007

FIGURE 1
ARCO PRODUCTS COMPANY
SERVICE STATION 6148, 5131 SHATTUCK AVE.
OAKLAND, CALIFORNIA
QUARTERLY GROUNDWATER MONITORING
SITE LOCATION

EA-SANJOSE-CAD/DRAWINGS: I:\0Z002\SITELOC.dwg Xrefs: <NONE>
Scale: 1 = 1.00 DimScale: 1 = 1.00 Date: 3/12/97 Time: 5:19 PM Operator: KAJ



EXPLANATION

- Groundwater monitoring well
- Vapor extraction well
- Air–sparge well
- Decommissioned well
- Existing underground gasoline storage tanks

0 30 60

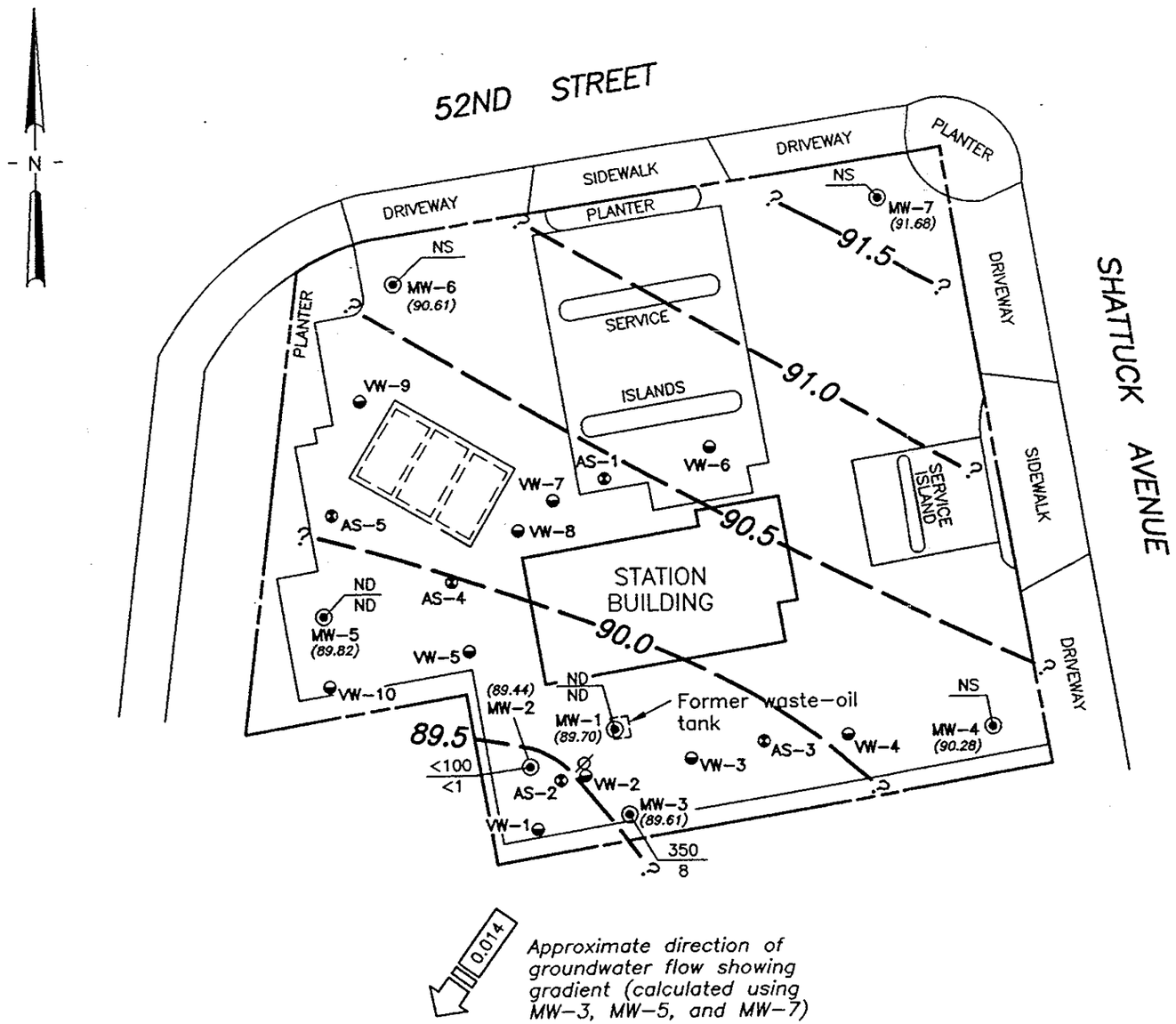
SCALE IN FEET

EMCON

DATE NOV. 1997
DWN KAJ
APP
REV
PROJECT NO. 805-135.007

FIGURE 2
ARCO PRODUCTS COMPANY
SERVICE STATION 6148, 5131 SHATTUCK AVE.
OAKLAND, CALIFORNIA
QUARTERLY GROUNDWATER MONITORING SITE PLAN

EA-SANJOSE-CAD/DRAWINGS: G:\805-135\SJSITE.dwg Xrefs: <NONE>
Scale: 1 = 30.00 DimScale: 1 = 30.00 Date: 5/5/97 Time: 12:52 PM Operator: KAJ



EXPLANATION

- Groundwater monitoring well
- Vapor extraction well
- Air-sparge well
- Decommissioned well
- Existing underground gasoline storage tank
- (89.61) Groundwater elevation (Ft.-MSL) measured 11/10/97
- Groundwater elevation contour (Ft.-MSL)
- 350 / 8 TPHG concentration in groundwater (ug/L); sampled 11/10/97 / Benzene concentration in groundwater (ug/L); sampled 11/10/97
- NS Not sampled; not scheduled for chemical analysis
- ND Not detected at or above the method reporting limit for TPHG (50 ug/L) and benzene (0.5 ug/L)
- < Raised method reporting limit due to high analyte concentration requiring sample dilution or matrix interference

0 30 60
APPROXIMATE SCALE IN FEET

EMCON

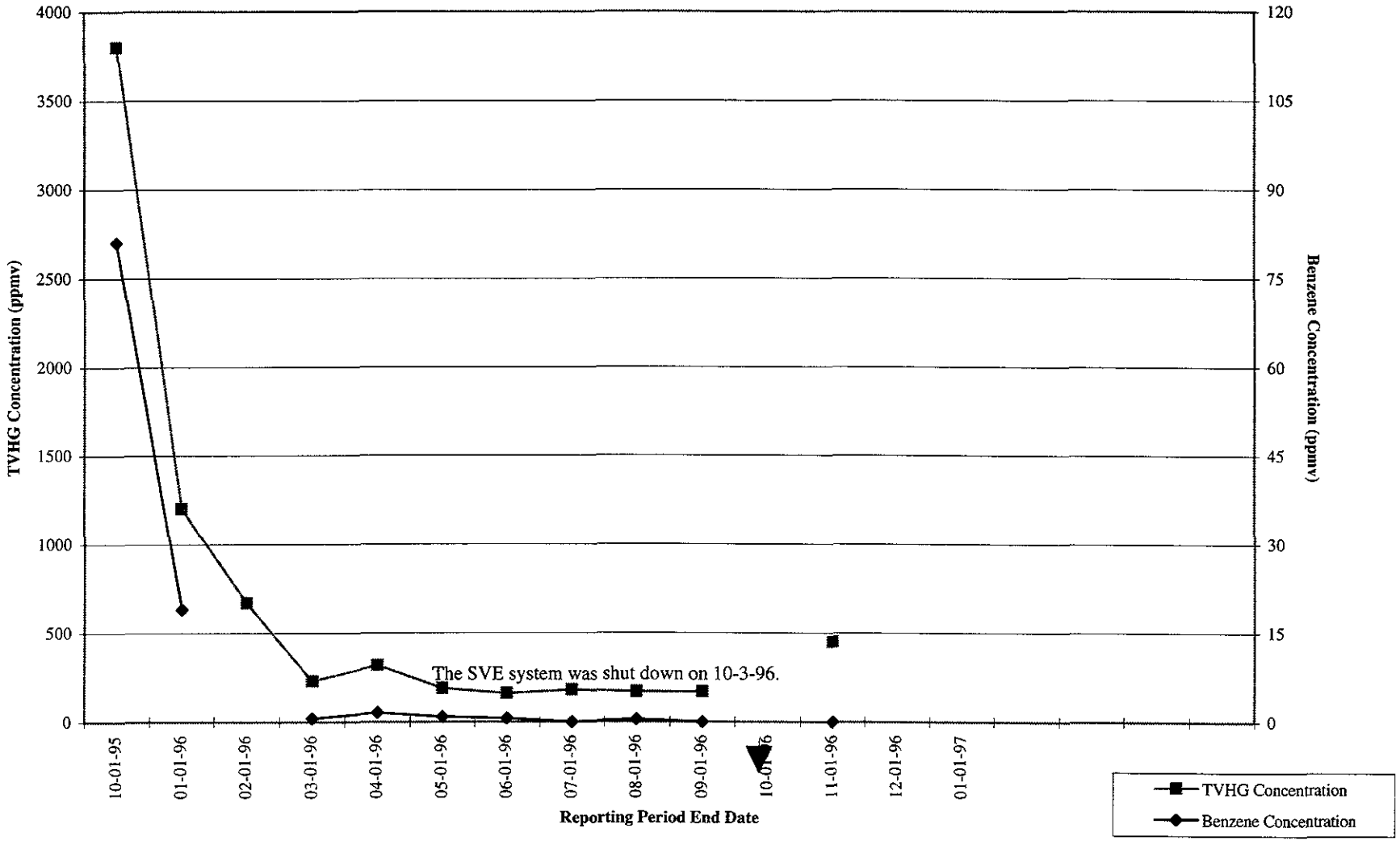
DATE MAR. 1998
DWN KAJ
APP
REV
PROJECT NO.
805-135.007

FIGURE 3
ARCO PRODUCTS COMPANY
SERVICE STATION 6148, 5131 SHATTUCK AVE.
OAKLAND, CALIFORNIA
QUARTERLY GROUNDWATER MONITORING
GROUNDWATER DATA - 4TH QUARTER 1997

EA-SANJOSE-CAD/DRAWINGS; G:\805-135\SJGWELEY.dwg Xrefs: <NONE>
Scale: 1 = 30.00 DimScale: 1 = 30.00 Date: 3/17/98 Time: 2:57 PM Operator: KAJ

Figure 4

ARCO Service Station 6148
Soil-Vapor Extraction and Treatment System
Historical Well Field Influent TVHG and Benzene Concentrations

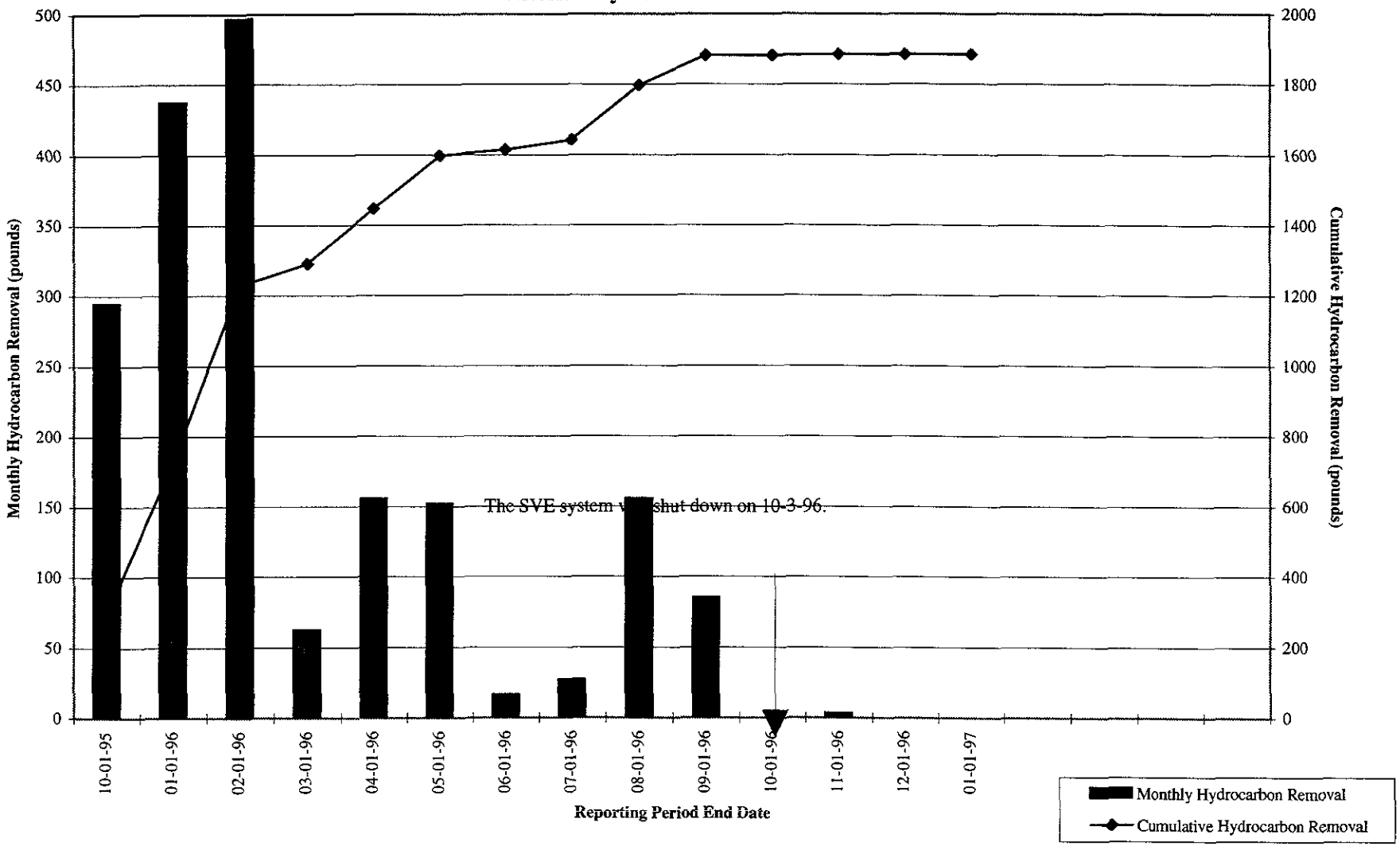


TVHG: total volatile hydrocarbons as gasoline
ppmv: parts per million by volume

esj/j:\qtr_rpts\6148\6148tdb.xls\SVE Model:mi
20805-135.007

Figure 5

ARCO Service Station 6148
Soil-Vapor Extraction and Treatment System
Historical Hydrocarbon Removal Rates



esj/j:\qtr_rpts\6148\6148tdb.xls\SVE Model:imi
20805-135.007

APPENDIX A

ANALYTICAL RESULTS AND CHAIN OF CUSTODY DOCUMENTATION, FOURTH QUARTER 1997 GROUNDWATER MONITORING EVENT

Columbia Analytical Services INC.

November 21, 1997 Service Request No.: S9702311

Gary Messerotes
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

RE: 20805-135.007/TO#21133.00/6148 OAKLAND

Dear Mr. Messerotes:

The following pages contain analytical results for sample(s) received by the laboratory on November 10, 1997. Results of sample analyses are followed by Appendix A which contains sample custody documentation and quality assurance deliverables requested for this project. The work requested has been assigned the Service Request No. listed above. To help expedite our service, please refer to this number when contacting the laboratory.

Analytical results were produced by procedures consistent with Columbia Analytical Services' (CAS) Quality Assurance Manual (with any deviations noted). Signature of this CAS Analytical Report below confirms that pages 2 through 13, following, have been thoroughly reviewed and approved for release in accord with CAS Standard Operating Procedure ADM-DatRev3.

Please feel welcome to contact me should you have questions or further needs.

Sincerely,

Steven L. Green
Project Chemist

Bernadette T. Cox for

Greg Anderson
Regional QA Coordinator

COLUMBIA ANALYTICAL SERVICES, Inc.
Acronyms

A2LA	American Association for Laboratory Accreditation
ASTM	American Society for Testing and Materials
BOD	Biochemical Oxygen Demand
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CAM	California Assessment Metals
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
COD	Chemical Oxygen Demand
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DLCS	Duplicate Laboratory Control Sample
DMS	Duplicate Matrix Spike
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
IC	Ion Chromatography
ICB	Initial Calibration Blank sample
ICP	Inductively Coupled Plasma atomic emission spectrometry
ICV	Initial Calibration Verification sample
J	Estimated concentration. The value is less than the MRL, but greater than or equal to the MDL. If the value is equal to the MRL, the result is actually <MRL before rounding.
LCS	Laboratory Control Sample
LUFT	Leaking Underground Fuel Tank
M	Modified
MBAS	Methylene Blue Active Substances
MCL	Maximum Contaminant Level. The highest permissible concentration of a substance allowed in drinking water as established by the U. S. EPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
MS	Matrix Spike
MTBE	Methyl tert-Butyl Ether
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the paper industry for Air and Stream Improvement
ND	Not Detected at or above the method reporting/detection limit (MRL/MDL)
NIOSH	National Institute for Occupational Safety and Health
NTU	Nephelometric Turbidity Units
ppb	Parts Per Billion
ppm	Parts Per Million
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
SIM	Selected Ion Monitoring
SM	Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992
STLC	Solubility Threshold Limit Concentration
SW	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Ed., 1986 and as amended by Updates I, II, IIA, and IIB.
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
tr	Trace level. The concentration of an analyte that is less than the PQL but greater than or equal to the MDL. If the value is equal to the PQL, the result is actually <PQL before rounding.
TRPH	Total Recoverable Petroleum Hydrocarbons
TSS	Total Suspended Solids
TTLC	Total Threshold Limit Concentration
VOA	Volatile Organic Analyte(s)

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702311
Project:	20805-135.007/TO#21133.00/6148 OAKLAND	**Date Collected:**	11/10/97
Sample Matrix:	Water	**Date Received:**	11/10/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-1(18)	Units:	ug/L (ppb)
Lab Code:	S9702311-001	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	11/16/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	11/16/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	11/16/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	11/16/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	11/16/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	11/16/97	4	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702311
Project:	20805-135.007/TO#21133.00/6148 OAKLAND	**Date Collected:**	11/10/97
Sample Matrix:	Water	**Date Received:**	11/10/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-5(16)	Units:	ug/L (ppb)
Lab Code:	S9702311-002	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	11/16/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	11/16/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	11/16/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	11/16/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	11/16/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	11/16/97	24	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702311
Project:	20805-135.007/TO#21133.00/6148 OAKLAND	**Date Collected:**	11/10/97
Sample Matrix:	Water	**Date Received:**	11/10/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-2(18)	Units:	ug/L (ppb)
Lab Code:	S9702311-003	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	2	NA	11/20/97	<100	C1
Benzene	EPA 5030	8020	0.5	2	NA	11/20/97	<1	C1
Toluene	EPA 5030	8020	0.5	2	NA	11/20/97	<1	C1
Ethylbenzene	EPA 5030	8020	0.5	2	NA	11/20/97	<1	C1
Xylenes, Total	EPA 5030	8020	0.5	2	NA	11/20/97	1	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	2	NA	11/20/97	74	

C1 The MRL was elevated due to high analyte concentration requiring sample dilution.

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702311
Project:	20805-135.007/TO#21133.00/6148 OAKLAND	**Date Collected:**	11/10/97
Sample Matrix:	Water	**Date Received:**	11/10/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-3(18)	Units:	ug/L (ppb)
Lab Code:	S9702311-004	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	4	NA	11/19/97	350	
Benzene	EPA 5030	8020	0.5	4	NA	11/19/97	8	
Toluene	EPA 5030	8020	0.5	4	NA	11/19/97	<2	C1
Ethylbenzene	EPA 5030	8020	0.5	4	NA	11/19/97	3	
Xylenes, Total	EPA 5030	8020	0.5	4	NA	11/19/97	3	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	4	NA	11/19/97	230	

C1 The MRL was elevated due to high analyte concentration requiring sample dilution.

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702311
Project:	20805-135.007/TO#21133.00/6148 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S971114-WB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	11/14/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	11/14/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	11/14/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	11/14/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	11/14/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	11/14/97	ND	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702311
Project:	20805-135.007/TO#21133.00/6148 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S971117-WB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	11/17/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	11/17/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	11/17/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	11/17/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	11/17/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	11/17/97	ND	

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702311
Project:	20805-135.007/TO#21133.00/6148 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S971119-WB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	11/19/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	11/19/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	11/19/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	11/19/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	11/19/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	11/19/97	ND	

1S22/020597p

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-135.007/TO#21133.00/6148 OAKLAND
Sample Matrix: Water

Service Request: S9702311
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: NA

Surrogate Recovery Summary
BTEX, MTBE and TPH as Gasoline

Prep Method: EPA 5030
Analysis Method: 8020 CA/LUFT

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery 4-Bromofluorobenzene	Percent Recovery a,a,a-Trifluorotoluene
MW-1(18)	S9702311-001		96	96
MW-5(16)	S9702311-002		98	95
MW-2(18)	S9702311-003		100	101
MW-3(18)	S9702311-004		106	88
BATCH QC	S9702317-001MS		98	97
BATCH QC	S9702317-001DMS		100	94
Method Blank	S971114-WB1		101	98
Method Blank	S971117-WB1		98	90
Method Blank	S971119-WB1		101	101
CAS Acceptance Limits:			69-116	69-116

SUR2/020397p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9702311
Project:	20805-135.007/TO#21133.00/6148 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	11/15/97

Matrix Spike/Duplicate Matrix Spike Summary
BTE

Sample Name:	BATCH QC	Units:	ug/L (ppb)
Lab Code:	S9702317-001MS, S9702317-001DMS	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference
Benzene	EPA 5030	8020	0.5	25	25	ND	24	25	96	100	75-135	4
Toluene	EPA 5030	8020	0.5	25	25	ND	25	25	100	100	73-136	<1
Ethylbenzene	EPA 5030	8020	0.5	25	25	ND	23	22	92	88	69-142	4

DMS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9702311
Project:	20805-135.007/TO#21133.00/6148 OAKLAND	**Date Analyzed:**	11/14/97

Initial Calibration Verification (ICV) Summary
BTEX, MTBE and TPH as Gasoline

Sample Name:	ICV	Units:	ug/L (ppb)
Lab Code:	ICV1	Basis:	NA
Test Notes:			

ICV Source:

Analyte	Prep Method	Analysis Method	True Value	Result	CAS Percent Recovery Acceptance Limits	Percent Recovery	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	250	250	90-110	100	
Benzene	EPA 5030	8020	25	23	85-115	92	
Toluene	EPA 5030	8020	25	23	85-115	92	
Ethylbenzene	EPA 5030	8020	25	23	85-115	92	
Xylenes, Total	EPA 5030	8020	75	68	85-115	91	
Methyl *tert*-Butyl Ether	EPA 5030	8020	25	24	85-115	96	

ICV/032196

TPH VOA F

ARCO Products Company
Division of Atlantic/Richfield Company

Task Order No. 21133.00

Chain of Custody

ARCO Facility no. 6148	City (Facility) Oakland	Project manager (Consultant) Gary Messerotes	Laboratory Name CAS
ARCO engineer Paul Supple	Telephone no. (ARCO)	Telephone no. (Consultant) (408) 453-7300	Fax no. (Consultant) (408) 453-0452
Consultant name EMCON	Address (Consultant) 1921 Ringwood Ave. San Jose, CA 95131		Contract Number

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH including EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM 503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Semi Metals ☐ VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org/DHS ☐ Lead EPA 7420/7421 ☐			
MW-1(68)	1	2		X		X	HCl		11:45		X												
MW-5(66)	2	2		X		X	HCl		12:00		X												
MW-2(68)	3	2		X		X	HCl		12:15		X												
MW-3(68)	4	2		X		X	HCl		12:30		X												

Method of shipment: Sampler will deliver

Special Detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: 2 - 40ml HCl VOAs

#20505-135.CCA

Lab Number: 9702311

Turnaround Time:

- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☒

DUE 11/21/97

Condition of sample.		Temperature received:	
Relinquished by sampler	Date 11/10/97 Time 1455	Received by	
Relinquished by	Date Time	Received by	JW as per CAS
Relinquished by	Date Time	Received by laboratory Ray Sanchez CAS	Date 11/10/97 Time 1455

Distribution: White Copy – Laboratory; Canary Copy – ARCO Environmental Engineering; Pink Copy – Consultant

Sampling Date on all Sample Containers 11/10/97

820/543

APPENDIX B

SVE SYSTEM MONITORING DATA LOG SHEETS

ARCO 6148
SVE SYSTEM
MONITORING DATA

Reporting Period
10/01/97 00 00
11/01/97 00 00

Hours in Period 744 00
Days in Period 31.00

Operation + Down Hours. 744.00
Operation + Down Days. 31.00

	Field Monitoring Data							Laboratory Monitoring Data																	
	Flow Rates		FID or PID Results					Well Field Influent				System Influent				System Effluent									
Reading Date & Time	Well Field Flow Rate	System Influent Flow Rate*	Well Field	System Influent	System Effluent	Destruction Efficiency	Laboratory Sample Time	Gasoline		Benzene		Gasoline		Benzene		Gasoline		Benzene		Destruction Efficiency	Gasoline Emission Rate	Benzene Emission Rate	Period Hours	Meter Hours	Hours of Operation	Days of Operation	Down Hours	Down Days
	scfm	scfm	ppm	ppm	ppm	%		ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	%	lb/day	lb/day						
10/01/97 00 00																								2698 56				
10/17/97 09 41	0.0	0 0																					393.68	2698.56	0 00	0.00	393 7	16 40
10/17/97 10 35	0.0	0 0																					0 90	2698.56	0 00	0.00	0 9	0 04
10/17/97 10 50	0.0	0 0	503																				0 25	2698 81	0 25	0.01	0.0	0 00
10/17/97 12 00	0 0	0 0																					1 17	2699 93	1.12	0 05	0.0	0 00
10/17/97 14 00	0.0	0 0					14 00	680	2800	24	78	680	2800	24	78	61	250	0 2	0.5	91 1	0 00	0 00	2 00	2699 93	0 00	0 00	2 0	0 08
11/01/97 00 00	0.0	0.0																					346 00	2699 93	0.00	0 00	346 0	14 42
Period Totals*								680	2800	24	78	680	2800	24	78	61	250	0 2	0 5	91 1	0 00	0 00	744 00		1 37	0 06	742 63	30 94
Period Averages	0.0	0.0																										

ARCO 6148
SVE SYSTEM
MONITORING DATA

Reporting Period
11/01/97 00 00
12/01/97 00 00

Hours in Period 720 00
Days in Period. 30.00

Operation + Down Hours. 720.00
Operation + Down Days 30.00

	Field Monitoring Data							Laboratory Monitoring Data														
	Flow Rates		FID or PID Results					Well Field Influent		System Influent		System Effluent										
Reading Date & Time	Well Field Flow Rate	System Influent Flow Rate*	Well Field	System Influent	System Effluent	Destruction Efficiency	Laboratory Sample Time	Gasoline	Benzene	Gasoline	Benzene	Gasoline	Benzene	Destruction Efficiency	Gasoline Emission Rate	Benzene Emission Rate	Period Hours	Meter Hours	Hours of Operation	Days of Operation	Down Hours	Down Days
	scfm	scfm	ppm	ppm	ppm	%		ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	%	lb/day	lb/day						
11/01/97 00 00																		2699 93				
11/05/97 09:55	0 0	0 0															105 92	2699 93	0 00	0.00	105 9	4 41
11/13/97 10.28	0 0	0 0	465														192 55	2699 93	0 00	0 00	192.6	8 02
12/01/97 00 00	0 0	0 0															421 53	2702 01	2 08	0.09	419.5	17 48
Period Totals																	720.00		2 08	0.09	717 92	29.91
Period Averages	0 0	0 0																				

ARCO 6148
SVE SYSTEM
MONITORING DATA

Reporting Period:
12/01/97 00:00
01/01/98 00.00

Hours in Period 744 00
Days in Period 31.00

Operation + Down Hours 744.00
Operation + Down Days: 31.00

	Field Monitoring Data							Laboratory Monitoring Data															
	Flow Rates		FID or PID Results					Well Field Influent		System Influent		System Effluent											
Reading Date & Time	Well Field Flow Rate	System Influent Flow Rate*	Well Field	System Influent	System Effluent	Destruction Efficiency	Laboratory Sample Time	Gasoline	Benzene	Gasoline	Benzene	Gasoline	Benzene	Destruction Efficiency	Gasoline Emission Rate	Benzene Emission Rate	Period Hours	Meter Hours	Hours of Operation	Days of Operation	Down Hours	Down Days
	scfm	scfm	ppm	ppm	ppm	%		ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	%	lb/day	lb/day						
12/01/97 00 00																		2702.01				
12/15/97 10 40	0 0	0 0															346 67	2702 01	0 00	0 00	346 7	14 44
01/01/98 00 00	0 0	0 0															397 33	2702 01	0 00	0.00	397.3	16 56
Period Totals																	744.00		0 00	0 00	744 00	31.00
Period Averages.	0 0	0 0																				

APPENDIX C

ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY DOCUMENTATION FOR SOIL-VAPOR EXTRACTION SYSTEM, FOURTH QUARTER 1997

Columbia Analytical Services inc.

RECEIVED
OCT 2 3 1997
EMCON/SACRAMENTO

October 22, 1997 Service Request No.: S9702098

Mr. Gowri Kowtha
EMCON
1433 North Market Blvd.
Sacramento, CA 95834

RE: 20805-135.007/TO#20830.00/6148 OAKLAND

Dear Mr. Kowtha:

The following pages contain analytical results for sample(s) received by the laboratory on October 17, 1997. Results of sample analyses are followed by Appendix A which contains sample custody documentation and quality assurance deliverables requested for this project. The work requested has been assigned the Service Request No. listed above. To help expedite our service, please refer to this number when contacting the laboratory.

Analytical results were produced by procedures consistent with Columbia Analytical Services' (CAS) Quality Assurance Manual (with any deviations noted). Signature of this CAS Analytical Report below confirms that pages 2 through 14, following, have been thoroughly reviewed and approved for release in accord with CAS Standard Operating Procedure ADM-DatRev3.

Please feel welcome to contact me should you have questions or further needs.

Sincerely,

Cristina V. Rayburn for

Bernadette T. Cox
Project Chemist

Greg Anderson
Regional QA Director

COLUMBIA ANALYTICAL SERVICES, Inc.
Acronyms

A2LA	American Association for Laboratory Accreditation
ASTM	American Society for Testing and Materials
BOD	Biochemical Oxygen Demand
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CAM	California Assessment Metals
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
COD	Chemical Oxygen Demand
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DLCS	Duplicate Laboratory Control Sample
DMS	Duplicate Matrix Spike
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	*Gas Chromatography/Mass Spectrometry*
IC	Ion Chromatography
ICB	Initial Calibration Blank sample
ICP	Inductively Coupled Plasma atomic emission spectrometry
ICV	Initial Calibration Verification sample
J	Estimated concentration. The value is less than the MRL, but greater than or equal to the MDL. If the value is equal to the MRL, the result is actually <MRL before rounding.
LCS	Laboratory Control Sample
LUFT	Leaking Underground Fuel Tank
M	Modified
MBAS	Methylene Blue Active Substances
MCL	Maximum Contaminant Level. The highest permissible concentration of a substance allowed in drinking water as established by the U. S. EPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
MS	Matrix Spike
MTBE	Methyl tert-Butyl Ether
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the paper industry for Air and Stream Improvement
ND	Not Detected at or above the method reporting/detection limit (MRL/MDL)
NIOSH	National Institute for Occupational Safety and Health
NTU	Nephelometric Turbidity Units
ppb	Parts Per Billion
ppm	Parts Per Million
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
SIM	Selected Ion Monitoring
SM	Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992
STLC	Solubility Threshold Limit Concentration
SW	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Ed., 1986 and as amended by Updates I, II, IIA, and IIB.
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
tr	Trace level. The concentration of an analyte that is less than the PQL but greater than or equal to the MDL. If the value is equal to the PQL, the result is actually <PQL before rounding.
TRPH	Total Recoverable Petroleum Hydrocarbons
TSS	Total Suspended Solids
TTLC	Total Threshold Limit Concentration
VOA	Volatile Organic Analyte(s)

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702098
Project:	20805-135.007/TO#20830.00/6148 OAKLAND	**Date Collected:**	10/17/97
Sample Matrix:	Air	**Date Received:**	10/17/97

BTEX and Total Volatile Hydrocarbons

Sample Name:	I-1	Units:	mg/m3
Lab Code:	S9702098-001	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	5030	8020	0.4	10	NA	10/18/97	78	
Toluene	5030	8020	0.4	10	NA	10/18/97	<4	C1
Ethylbenzene	5030	8020	0.5	10	NA	10/18/97	71	
Xylenes, Total	5030	8020	0.9	10	NA	10/18/97	85	
Total Volatile Hydrocarbons*								
C1 - C5	5030	8015M	12	10	NA	10/18/97	3000	
C6 - C12	5030	8015M	20	10	NA	10/18/97	2800	
TPH as Gasoline*	5030	8015M	20	10	NA	10/18/97	5800	

* TPH as gasoline is defined as C6 (benzene) through C12 (dodecane) and uses a molecular weight of 100 to calculate the ppmv.

C1 The MRL was elevated due to high analyte concentration requiring sample dilution.

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702098
Project:	20805-135 007/TO#20830 00/6148 OAKLAND	**Date Collected:**	10/17/97
Sample Matrix:	Air	**Date Received:**	10/17/97

BTEX and Total Volatile Hydrocarbons

Sample Name:	I-1	Units:	ppmV
Lab Code:	S9702098-001	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	5030	8020	0.4	0	NA	10/18/97	24	
Toluene	5030	8020	0.4	0	NA	10/18/97	<1	C1
Ethylbenzene	5030	8020	0.4	0	NA	10/18/97	16	
Xylenes, Total	5030	8020	0.4	0	NA	10/18/97	20	
Total Volatile Hydrocarbons:								
C1 - C5	5030	8015M	5	0	NA	10/18/97	1300	
C6 - C12	5030	8015M	5	0	NA	10/18/97	680	
TPH as Gasoline*	5030	8015M	5	0	NA	10/18/97	1400	

* TPH as gasoline is defined as C6 (benzene) through C12 (dodecane) and uses a molecular weight of 100 to calculate the ppmv.

C1 The MRL was elevated due to high analyte concentration requiring sample dilution.

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702098
Project:	20805-135.007/TO#20830.00/6148 OAKLAND	**Date Collected:**	10/17/97
Sample Matrix:	Air	**Date Received:**	10/17/97

BTEX and Total Volatile Hydrocarbons

Sample Name	E-1	Units:	mg/m3
Lab Code:	S9702098-002	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	5030	8020	0.4	1	NA	10/18/97	0.5	
Toluene	5030	8020	0.4	1	NA	10/18/97	1.0	
Ethylbenzene	5030	8020	0.5	1	NA	10/18/97	1.1	
Xylenes, Total	5030	8020	0.9	1	NA	10/18/97	2.6	
Total Volatile Hydrocarbons:								
C1 - C5	5030	8015M	12	1	NA	10/18/97	260	
C6 - C12	5030	8015M	20	1	NA	10/18/97	250	
TPH as Gasoline*	5030	8015M	20	1	NA	10/18/97	510	

* TPH as gasoline is defined as C6 (benzene) through C12 (dodecane) and uses a molecular weight of 100 to calculate the ppmv.

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702098
Project:	20805-135.007/TO#20830.00/6148 OAKLAND	**Date Collected:**	10/17/97
Sample Matrix:	Air	**Date Received:**	10/17/97

BTEX and Total Volatile Hydrocarbons

Sample Name:	E-1	Units:	ppmV
Lab Code:	S9702098-002	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	5030	8020	0.1	1	NA	10/18/97	0.2	
Toluene	5030	8020	0.1	1	NA	10/18/97	0.3	
Ethylbenzene	5030	8020	0.1	1	NA	10/18/97	0.3	
Xylenes, Total	5030	8020	0.2	1	NA	10/18/97	0.6	
Total Volatile Hydrocarbons:								
C1 - C5	5030	8015M	5	1	NA	10/18/97	110	
C6 - C12	5030	8015M	5	1	NA	10/18/97	61	
TPH as Gasoline*	5030	8015M	5	1	NA	10/18/97	120	

* TPH as gasoline is defined as C6 (benzene) through C12 (dodecane) and uses a molecular weight of 100 to calculate the ppmv.

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702098
Project:	20805-135.007/TO#20830 00/6148 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Air	**Date Received:**	NA

BTEX and Total Volatile Hydrocarbons

Sample Name:	Method Blank	Units:	mg/m3
Lab Code:	S971018-VB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	5030	8020	0.4	1	NA	10/18/97	ND	
Toluene	5030	8020	0.4	1	NA	10/18/97	ND	
Ethylbenzene	5030	8020	0.5	1	NA	10/18/97	ND	
Xylenes, Total	5030	8020	0.9	1	NA	10/18/97	ND	
Total Volatile Hydrocarbons:								
C1 - C5	5030	8015M	12	1	NA	10/18/97	ND	
C6 - C12	5030	8015M	20	1	NA	10/18/97	ND	
TPH as Gasoline*	5030	8015M	20	1	NA	10/18/97	ND	

* TPH as gasoline is defined as C6 (benzene) through C12 (dodecane) and uses a molecular weight of 100 to calculate the ppmv.

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702098
Project:	20805-135 007/TO#20830.00/6148 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Air	**Date Received:**	NA

BTEX and Total Volatile Hydrocarbons

Sample Name:	Method Blank	Units:	ppmV
Lab Code:	S971018-VB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	5030	8020	0.1	1	NA	10/18/97	ND	
Toluene	5030	8020	0.1	1	NA	10/18/97	ND	
Ethylbenzene	5030	8020	0.1	1	NA	10/18/97	ND	
Xylenes, Total	5030	8020	0.2	1	NA	10/18/97	ND	
Total Volatile Hydrocarbons:								
C1 - C5	5030	8015M	5	1	NA	10/18/97	ND	
C6 - C12	5030	8015M	5	1	NA	10/18/97	ND	
TPH as Gasoline*	5030	8015M	5	1	NA	10/18/97	ND	

* TPH as gasoline is defined as C6 (benzene) through C12 (dodecane) and uses a molecular weight of 100 to calculate the ppmv.

1S22/020597p

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-135.007/TO#20830.00/6148 OAKLAND
Sample Matrix: Air

Service Request: S9702098
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 10/18-19/97

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Sample Name: I-1
Lab Code: S9702098-001DUP
Test Notes:

Units: mg/m3
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Benzene	5030	8020	0.4	78	68	73	14	
Toluene	5030	8020	0.4	<4	<4	NA	NA	
Ethylbenzene	5030	8020	0.5	71	72	72	1	
Xylenes, Total	5030	8020	0.9	85	97	91	13	
Total Volatile Hydrocarbons								
C1 - C5	5030	8015M	12	3000	3000	3000	NA	
C6 - C12	5030	8015M	20	2800	3000	2900	9	
TPH as Gasoline*	5030	8015M	20	5800	6000	5900	3	

DUP/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-135 007/TO#20830.00/6148 OAKLAND
Sample Matrix: Air

Service Request: S9702098
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 10/18-19/97

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Sample Name: I-1
Lab Code: S9702098-001DUP
Test Notes:

Units: ppmV
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Benzene	5030	8020	0.1	24	21	22	5	
Toluene	5030	8020	0.1	<1	<1	NA	NA	
Ethylbenzene	5030	8020	0.1	16	17	16	6	
Xylenes, Total	5030	8020	0.2	20	22	21	10	
Total Volatile Hydrocarbons								
C1 - C5	5030	8015M	5	1300	1300	1,300	<1	
C6 - C12	5030	8015M	5	680	730	700	7	
TPH as Gasoline*	5030	8015M	5	1400	1500	1,400	7	

DUP/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9702098
Project:	20805-135 007/TO#20830 00/6148 OAKLAND	**Date Collected:**	NA
LCS Matrix:	Air	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	10/18/97

Laboratory Control Sample Summary
BTE

Sample Name:	Lab Control Sample	Units:	mg/m3
Lab Code:	S971017-LCS	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Benzene	5030	8020	24	20	83	60-140	
Toluene	5030	8020	24	19	79	60-140	
Ethylbenzene	5030	8020	24	19	79	60-140	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9702098
Project:	20805-135 007/TO#20830.00/6148 OAKLAND	**Date Collected:**	NA
LCS Matrix:	Air	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	10/18/97

Laboratory Control Sample Summary
BTE

Sample Name:	Lab Control Sample	Units:	ppmV
Lab Code:	S971017-LCS	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Benzene	5030	8020	7.5	20	267	60-140	
Toluene	5030	8020	6.4	19	297	60-140	
Ethylbenzene	5030	8020	5.5	19	345	60-140	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9702098
Project:	20805-135.007/TO#20830.00/6148 OAKLAND	**Date Analyzed:**	10/18/97

Initial Calibration Verification (ICV) Summary
BTEX and Total Volatile Hydrocarbons

Sample Name:	ICV	Units:	mg/m3
Lab Code:	ICV1	Basis:	NA
Test Notes:			

ICV Source:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Acceptance Limits
Benzene	5030	8020	25	25	100	80-120
Toluene	5030	8020	25	25	100	80-120
Ethylbenzene	5030	8020	25	25	100	80-120
Xylenes, Total	5030	8020	75	77	103	80-120
Gasoline	5030	8015M	250	260	104	80-120

ICV/032196

TPH F

ARCO Products Company
Division of Atlantic/Richfield Company

Task Order No. 20830.00

Chain of Custody

ARCO Facility no. 148	City (Facility) Oakland CA	Project manager (Consultant) Gowri Kowtha	Laboratory Name CAS
ARCO engineer Paul Supple	Telephone no. (ARCO) 408 377 8697	Telephone no. (Consultant)	Fax no. (Consultant)
Consultant name Emcon	Address (Consultant) 1921 Ringwood Ave SJ CA		Contract Number

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015 Gas	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM 503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Semi Metals ☐ VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org/DHS ☐ Lead EPA 7420/7421 ☐			
F-1	1				AIR			10/17			X												
E-1	2				↓			10/17			X												

Special Detection Limit/reporting: Report in PPM & mg/kg

Special QA/QC

Remarks: 20805-135-007

Lab Number: 59702098

Turnaround Time:

- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☒

Condition of sample:

Temperature received:

Relinquished by sampler: Luke Ruth	Date: 10-17-97	Time: 1400	Received by:
Relinquished by:	Date:	Time:	Received by:
Relinquished by:	Date:	Time:	Received by laboratory: Kristina Sanchez — Date: 10/17/97 — Time: 1400

Distribution: White Copy – Laboratory Canary Copy – ARCO Environmental Engineering Pink Copy – Consultant

VOC LAB